AMERICAN GAS JOURNAL

NOVEMBER 1940

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TECHNICAL DIVISION

MANUFACTURER
RETAILER
CONSUMER

All 3 factors in distributi
welcome these 3 adva
heat control featu

Robertshaw can always be depended upon to provide improvements which enable gas companies and equipment dealers to *prove* to the consumer that the *best* cooking service is *gas* cooking service.

Are your salesmen armed with this efficient sales manual? It's boosting earnings for thousands of salesmen every working day. Write for a copy—free.

1. GREATER
Simplicity

One motion turns gas on full—sets control. It saves one more operation for the user. Brings gas operating one step closer to complete automatic service.

2. GREATER
Speed

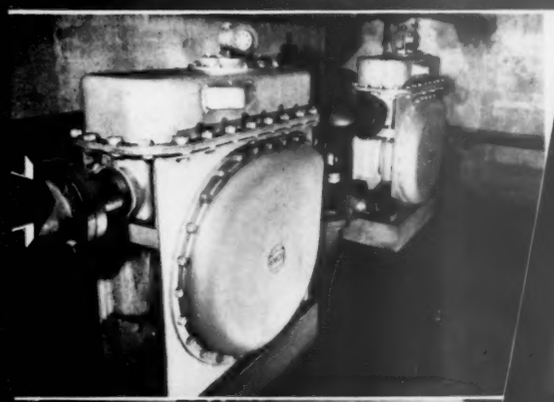
With cock and thermostat dial combined in one unit, user will turn dial fairly high when lighting the oven. The resulting full flow of gas assures quick, safe ignition.

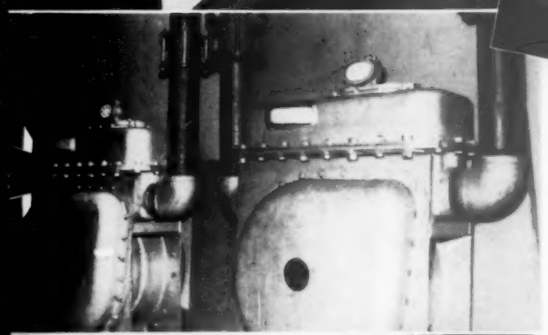
3. GREATER
Accuracy

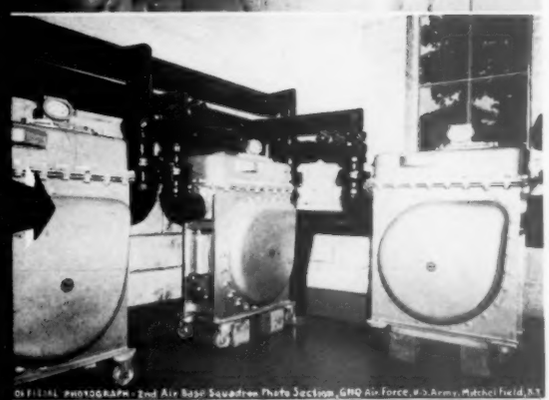
Each time oven is used, thermostat must be set. Each time oven is turned off, thermostat setting is automatically cancelled. Automatic cooking with gas is made more certain and brought into wider use.

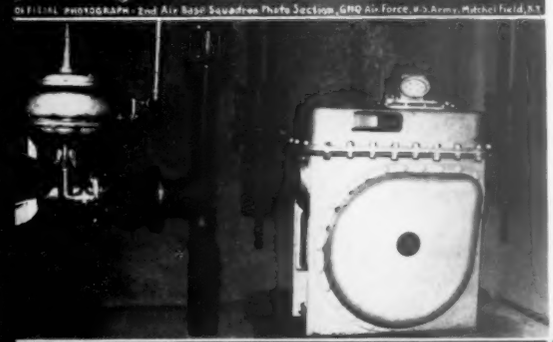
ROBERTSHAW
THERMOSTAT COMPANY
YOUNGWOOD, PA.

for Manufactured Gas Lines...too!









Large Capacity Pressed Steel Meters

METERING manufactured gas consumed by large industrial plants has long been a problem to gas companies who, through tradition or otherwise, have installed bulky, fire hazardous tin meters on many of these services.

Distribution men have long felt that the tin case meter is most unsatisfactory for large industrial installations. On the other hand, cast iron meters of comparable capacity are difficult to install, due to their weight, and offer but small advantage insofar as conserving space is concerned.

The ideal way to measure large volumes of manufactured gas is with EMCO Pressed Steel Meters. They require less floor space per cubic foot capacity than any other meter. They have rolling type diaphragms, accessible diaphragm drains, exclusive valve features, parts that are interchangeable, and are easily repaired in the line.

These meters are in strict accordance with the most advanced pressed steel designs and, consequently, the manufactured gas industry is furnished with a light, compact, yet strong construction having all the inherent simplicity and accurate measurement qualities of the well known EMCO line. Write for Bulletin 1033 which describes these meters in detail.

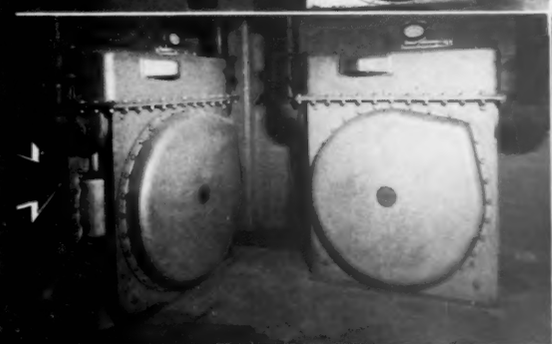
The installation photos show EMCO Pressed Steel Meters measuring manufactured gas in various industrial settings along the Eastern seaboard.

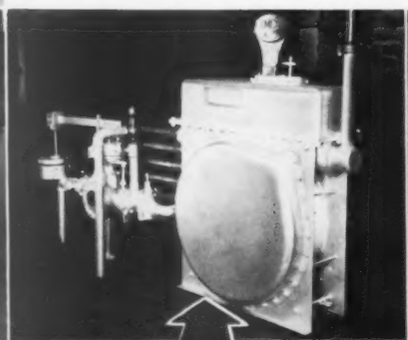
PITTSBURGH EQUITABLE METER COMPANY

MERCO NORDSTROM VALVE CO.

NEW YORK · BUFFALO · PHILADELPHIA · KANSAS CITY · TULSA · LOS ANGELES · DES MOINES · CHICAGO · COLUMBIA · MEMPHIS · OAKLAND · HOUSTON

Main Offices - PITTSBURGH, PA.





Lower Labor Costs- Longer Gas Making Time

with a

Lymn-Rambush

MECHANICAL GRATE

If you are looking for means of reducing costs, consider the Lymn-Rambush Mechanical Grate. With it, full capacity of the water gas machine is constantly maintained by the unvarying fire conditions resulting from continuous and uniform ash removal.

In the Lymn-Rambush design, a conical, undulatory grate forces clinker from the center to the sides where a wearing strip crushes clinker to a size suitable for removal. A revolving table carries ash around to an ash box. The undulatory shape of the grate raises and lowers the fire, maintaining uniform density.

OVER FORTY INSTALLATIONS

of the Lymn-Rambush Mechanical Grate assure its dependability and durability. Let us tell you more about it.

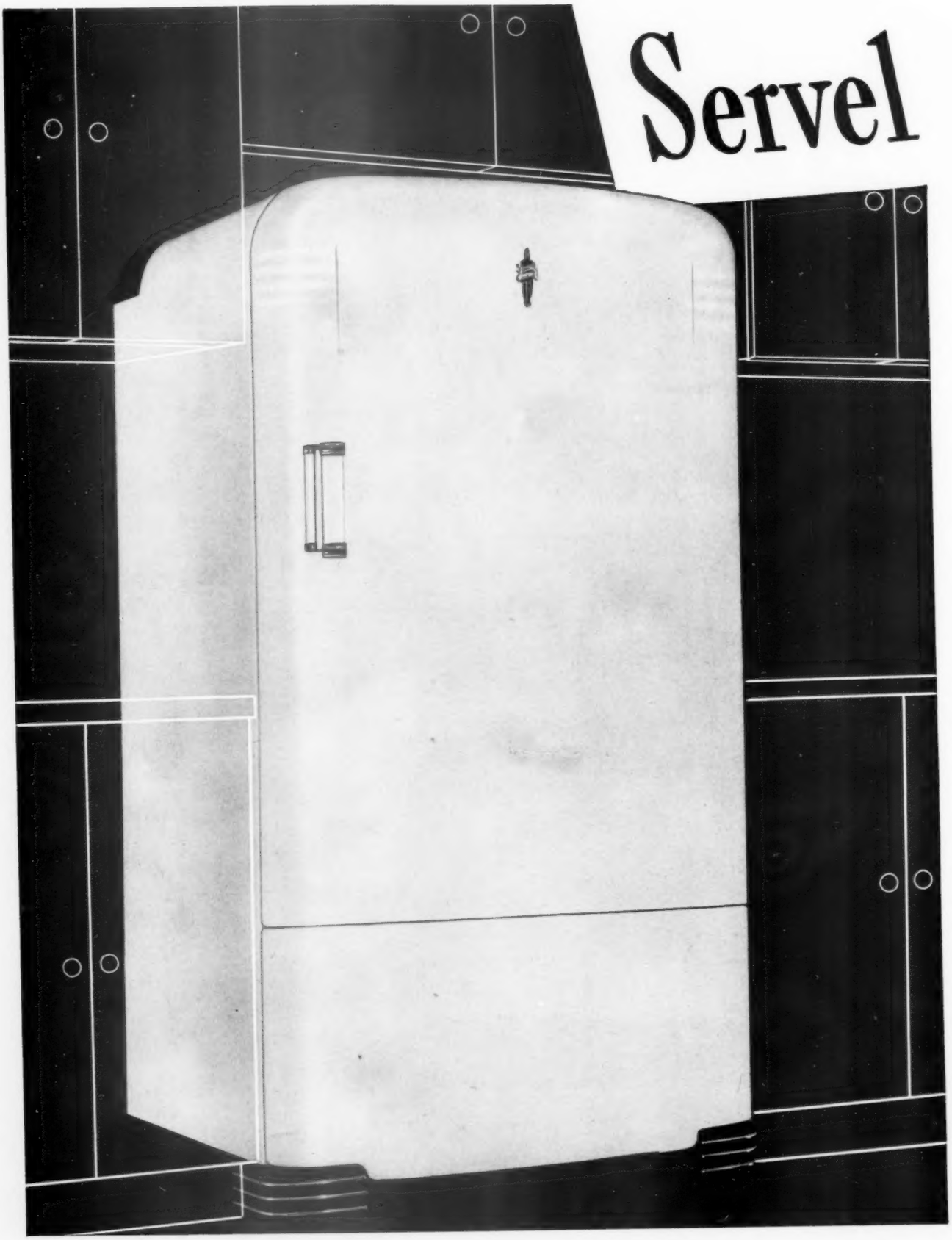
SEMET-SOLVAY ENGINEERING CORPORATION

40 RECTOR STREET — NEW YORK, N. Y.

SEMET-SOLVAY ENGINEERING CORP. WE SELL SOLUTIONS TO HARD PROBLEMS NEW YORK

AMERICAN GAS JOURNAL, November, 1940. Vol. 153, No. 5. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 52 Park Place, New York, N. Y. Entered as second-class matter, October 7, 1928, at the post-office at East Stroudsburg, Pa., under the Act of March 3, 1879. Printed in U. S. A.

Servel



★ ITS BEAUTY IS ONLY THE BEGINNING . . .

for 1941 presents...

★ New beauty
★ New efficiency
★ New economy
★ New convenience

THIS beautiful new Gas Refrigerator has *everything* American families want! Every feature, every improvement of the 1941 Servel Electrolux will invite more sales during the coming year.

For every one was determined after extensive research among American families!

Housewives declared they wanted 5 fundamentals in their next refrigerators: permanent silence, long life, constant temperature, low operating cost, freedom from costly repairs.

In addition, it was found they wanted greater storage space, streamlined beauty, faster freezing, ice cubes and grids that are easy to remove, and many other conveniences. So—Servel gave them what they wanted!

New quality . . . new values . . . new beauty in the NEW 1941 Servel Electrolux! It's the most beautiful refrigerator ever designed . . . streamlined to fit the times with new features that further improve the only automatic refrigerator that freezes with no moving parts . . . *stays silent—lasts longer.*

The cabinet has been reduced in depth to fit more advantageously into the modern kitchen . . . the stainless steel trim on the base adds to the beauty . . . the door is full width . . . the door latch has been redesigned but retains popular push and pull features . . . the handle is of transparent plastic, will not fingerprint or mark.

But that's only the outside . . .

WAIT TILL YOU SEE THE INSIDE STORY

Watch their eyes...

WIN GOOD WILL FOR GAS AND

WHEN THEY SEE SERVEL FOR '41

More Ice Cubes, Easier to Remove . . . Sliding Shelves . . . Redesigned Interior . . . Other Exciting Features . . . All Will Help to Boost Gas Refrigeration Among Your Customers

39% more ice . . . faster freezing with this new, de luxe improved Servel Electrolux freezing unit. Note the new and improved trigger release design, the handy extra space for storing frozen foods.

New grid and cube release of improved design operates in a single easy motion, freeing both grid and ice cubes at the same time. This is another exclusive Servel Electrolux sales feature for 1941.

3-position sliding shelf can be raised or lowered without removing the food. For still greater flexibility, the shelf immediately below may be quickly adjusted to two positions.

MOIST COLD... DRY COLD... Servel Electrolux gives both!

Dew-action vegetable freshener: moisture collects and falls like morning dew from the under side of the transparent glass cover.

Dry or moist meat storage: simply change the position of the porcelain cover to allow more or less air to circulate.

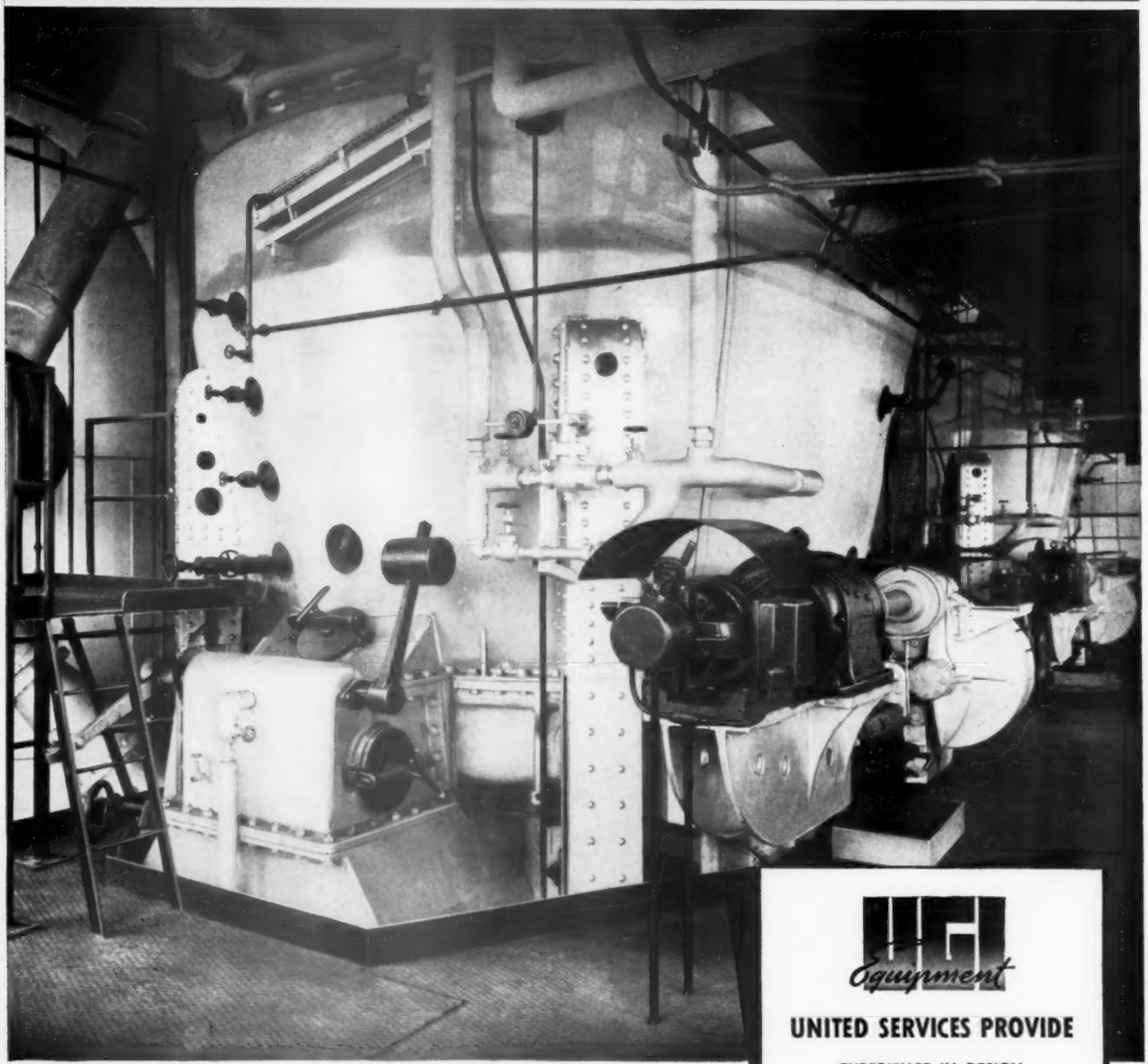
PLUS MANY OTHERS . . . EACH AN ADDED SALES POINT!

Stays silent...lasts longer

SERVEL
ELECTROLUX
Gas
REFRIGERATOR

GAS SERVICE WITH

USE "UNITED ENGINEERS" FOR PLANT EXPANSION



U. G. I. MECHANICAL GENERATOR Water Gas Sets are rugged in design, give long periods of continuous operation and operate with high capacities and efficiencies.

U. G. I. MECHANICAL GENERATOR Water Gas Sets, plus modern and efficient gas and fuel-handling apparatus, insure economical gas production.

There are fifty-three installations of U. G. I. Mechanical Generators installed or contracted for, twenty-nine in utility plants and twenty-four in industrial plants.

U.G.I. Equipment

UNITED SERVICES PROVIDE

EXPERIENCE IN DESIGN
United has over 50 years experience in gas plant design.

EFFICIENT APPARATUS
United has pioneered major developments in water and coal gas production.

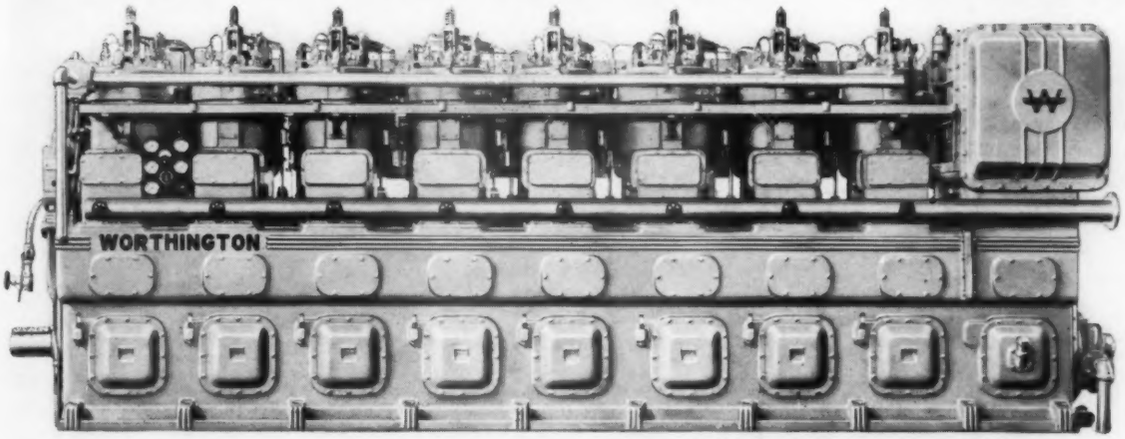
ECONOMICAL CONSTRUCTION
United has large well organized forces for gas plant and general construction work.

EXPERIENCE IN OPERATION
United has experienced plant operators for securing most efficient results.

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK PHILADELPHIA CHICAGO

HEAVY CONSTRUCTION THROUGHOUT...



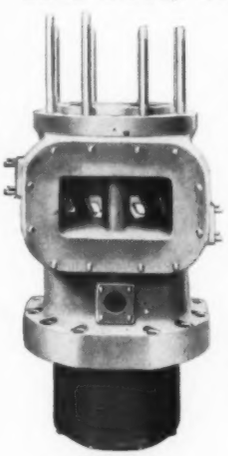
A 1000 hp.
LTC unit

a basic design feature of

WORTHINGTON LTC
ANGLE ENGINE-COMPRESSORS

IN engines built for mobile equipment, or where frequent changes of location are contemplated, light weight construction is essential. However, for stationary engines, designed for long life and continuous full load service, light weight is not desirable.

HEAVY CONSTRUCTION implies the placing of ample masses of metal *in correct structural relation,* to assure *strength, rigidity, maintained alignment, low wear, long life.* The result of all these factors is **LOW-COST, TROUBLE-FREE OPERATION.**



Cylinder

Cylinder Liner

THE FRAME, the "backbone" of the engine, is carefully designed. Thick walls and flanges, heavy ribbing, box sections, long bearing seats, large studs, deep oil sump —all contribute to strong, rigid construction.

THE CYLINDERS, with replaceable liners, are massive, individual castings—flanges are deep, studs are numerous and large.

THE CYLINDER LINERS are of alloy nickel iron, removable for jacket cleaning, and permitting low cost replacement. They bear on the cylinders at four points, and are double sealed against jacket leakage.

THE MAIN BEARINGS, with steel shells, are held rigidly in place by heavy cast caps and four studs as shown in the picture at the right, assuring permanent alignment and minimum shaft deflection.

THE SHAFT is of large diameter with heavy crank webs.

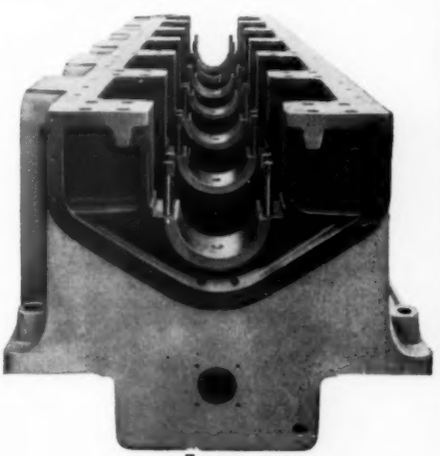
●

SIX SIZES

375 . . . 500 . . . 625 . . . 750 . . . 875 . . . 1000

BRAKE HORSE POWER

COMPRESSOR CYLINDERS—A wide selection of types and designs are available, in cast iron, cast steel or in steel forging as pressures may require. These follow the usual Worthington design as used on motor and steam driven compressors.



Frame

WORTHINGTON LTC
ANGLE ENGINE-COMPRESSORS
HAVE ALL THESE FEATURES

●

HEAVY CONSTRUCTION
STRAIGHT LINE DESIGN
SINGLE SCAVENGING AIR PUMP
REPLACEABLE CYLINDER LINERS
CONE TYPE CYLINDER HEADS
CAST-IN LUBE OIL DUCTS

CO-5

WORTHINGTON PUMP AND MACHINERY CORPORATION • *General Offices:* HARRISON, NEW JERSEY

WORTHINGTON

Good Will

The most valued asset of a Gas Utility

INSURED by UNIVERSAL

★ Consumer Good Will is the greatest insurance that any Gas Utility Company can have against the possibility of inroads by competitive fuels. The Universal Gas Range guarantees not only consumer Good Will, but a better appreciation of the true merits of Gas for all cooking purposes because it assures a new and higher standard of Automatic Controlled Performance in broiling, oven and top burner cooking.

Universal GAS RANGES

MANUFACTURED BY CRIBBEN & SEXTON CO.—700 N. SACRAMENTO BLVD.—CHICAGO

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another HOLLYWOOD budget acquires a watchdog

■ Out of the thousands of METRIC-AMERICAN Ironcase Meters in service, these two have perhaps a special interest because of their association with one of Filmdom's stellar names.

Installed by the Northern Division of Southern California Gas Company, the two meters provide an accurate, running record of gas consumption at these famous studios.

Fuel cost records are simplified . . . instantly accessible . . . true.

One-piece, leakproof body construction and specially treated diaphragms, together with the approved two-bellows, slide valve design, insure both precision gas measurement and the ruggedness that means a long and trouble-free meter life.

Catalog EG-40 gives complete construction details—and the reasons for the unsurpassed performance records and world-wide installations of the METRIC-AMERICAN Ironcase. Write for your copy.

METRIC METAL WORKS • ERIE, PA.

AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

NOVEMBER
1940

AMERICAN
GAS JOURNAL

VOLUME 153
No. 5

The 22nd Annual Convention
American Gas Association

NATIONAL DEFENSE and the war were the subjects claiming major attention at the Annual Convention of the American Gas Association, held at Atlantic City, N. J., October 7th to 10th. Most of the speakers at the general sessions referred at considerable length to world conditions and the uncertainties confronting all of us; and some of the sectional papers dealt at length with these matters.

The tone of the Convention was serious, and a registered attendance of 2,960 indicated the interest shown in the program.

From the standpoint of competition it seemed to be quite definitely the opinion that we are solving our problems and placing ourselves on an increasingly firm and satisfactory basis. However, no one should think it is any time to let up in our efforts.

From the standpoint of world affairs no one can yet foresee what lies ahead.

Dr. Harold G. Moulton, President of The Brookings Institution took a somewhat hopeful view in his address entitled "Industry in a Changing World." He said in part:

"Fears of the unknown future cast a shadow over much of our current thought and activity. Two great questions confront American industry at this difficult period of our history. What is likely to be the effect of the national defense program upon the nation's economy? What will be the aftermath of the conflict which is now raging over a large portion of the civilized world?

"The first question involves consideration of the impact of the defense program both upon the industrial structure of the nation and upon the financial situation. The second issue involves analysis of post-war economic and financial readjustments, both internally and internationally.

"It is, of course, impossible to speak with assurance on these great issues because of the paramount importance of the unknown elements in the situation. Will the United States program merely involve adequate defense, or will we be drawn into the world conflict? Will the totalitarian powers be defeated, and if so, when? Assuming we remain a non-belligerent nation and that the present conflict ends in a sweeping victory for the dictators, what will be the repercussions upon American trade? If Britain wins, with or with our direct participation, how will the future outlook be altered? Since we do not know the answer to the military and political questions, our economic analysis has to be based on alternative assumption.

"Assuming that the magnitude of our economic war effort is forecast with reasonable accuracy by the military program already outlined, it would appear that the American economy need not be profoundly disrupted. . . . Not unless we became actively involved in the war over a considerable period of time and in a way which requires recruiting of a very much larger army than is now under consideration, would an extensive shifting of productive activities from ordinary peace-time pursuits to war-time objectives be necessary.

"Now is there any underlying reason why a great distortion of commodity prices is necessary? Since our productive facilities in most lines are being utilized at much less than capacity, unit costs will tend to decrease rather than increase as output expands. This fact, of course, explains the increase in profits which comes with war-time expansion of output. It is only when we reach the stage of shortages involving the employment of less efficient labor, and plant equipment, that costs and prices need rise.

"Of course, when we reach that stage, that will appear in some lines sooner than others; it will appear here and there fairly soon, but by and large there is a great amount of slack to be taken up before the stage of rising costs—before rising costs necessitate rising prices.

"That is based upon the assumption that there is a general advance in wage costs and also based upon the assumption that the method used in financing the defense program—and a war if it should come—are sound in character.

"A question of particular interest to your industry is whether wages rise. During the course of the last war wages did rise and it was regarded as essential to increase them because of the rising cost of living. There was also intense competitive bidding by industries and by government establishments for certain kinds

of labor in the last war, and even before our entrance into the struggle.

"There was also a very great rise in the prices of agricultural products resulting from the intense European demand. That situation does not exist at this time and in view of our agricultural productive capacity in general I see no basic reason for the belief that we should very early in the struggle have any considerable rise—indeed any rise in prices of agricultural products.

"The real danger, however, rests in the possibility that industrial wages may be raised because of competitive bidding which starts an upward trend in wages, such competition starting in the essential war industries, or because of the adoption of the principle of paying time and one-half for overtime beyond the 40-hour basis.

"I see no reason whatsoever why American labor should expect to have time and a half for overtime beyond the 40-hour period. They get an increase in wages and thus instead of sacrificing in terms of income they stand to gain in terms of income irrespective of an increase in wage rates. But if the principle is generally adopted of increasing the working hours and increasing the rate of pay for all beyond the 40-hour limit, then we have the beginning of an upward spiral of rising c o s t s and rising prices. So that phase of the problem is one of greatest importance at the present time.

"My conclusion is that in view of the slack in the industrial system, in view of the possibility of lower unit costs as volume expands, and in view of possibilities of increased efficiency, it is possible to go through or carry on the defense program without any appreciable rise in the general level of prices.

"It is of the utmost importance that this be accomplished because the financial readjustments following a war have in the past proved to be of the most serious character.

"If the national defense program can be carried through without extensive industrial readjustments and without serious p r i c e distortions, then the post war readjustments, so far as domestic factors are concerned (leaving out of consideration the international problem for the moment) need present no serious difficulties.

* * * *

"America's answer to post war competitive problems m u s t be increased efficiency. Both during the war and after unceasing attention must be given to the problem of reducing the cost of production. By making prompt use of new scientific discoveries and inventions and by continuously installing more efficient plants and equipment, the United States will be able in the post-war period to produce on a lower cost plane than ever before.

"To sum up the situation with respect to the international competition in a single sentence, I would say that in view of the destructive consequences wrought by the war in Europe there would seem to be no sound basis for the fear that in the after war period Europe's competitive position will have become far stronger than our own."

In an address entitled "The Consumer Movement is With Us—What About It?," John Benson, President of the American Association of Advertising Agencies, alluded to the present world conditions as follows:

"I shall deal with the subject assigned me as an important phase of my major theme which is 'SOLIDARITY, an all embracing need in the present crisis.'

"The world is in a sorry state. Brutal forces have struck a staggering blow at more civilized countries, whose lack of solidarity in their people made them an easy victim.

"France collapsed because she was spiritually as well as physically unprepared to meet the well directed onslaught of a determined foe. There seemed to be a listlessness about it, out of keeping with the French love of f r e e d o m and national spirit. Something had sapped that spirit and left her helpless.

"The thrust of G e r m a n y into France was energized by a will to win in a cause which however abhorrent from our point of view, stirred German youth to supreme effort and sent them singing into battle.

"Can our loosely-knit democracy defend itself against such force without fusing its will and its intelligence into a solidarity hitherto unknown? And that goes for more than military conflict. There will be a commercial conflict to meet during and after the present war which may require every ounce of effective energy we can muster both at home and abroad.

"I do not mean to draw any parallel between the democracies of Europe and our own, as far as military peril is concerned. It may be grave peril and it may not. We are in a very different position, with our isolation and our huge productive power.

"This is an issue I have neither the time nor competence to discuss. I shall try to deal with the subtler peril of a disintegrating world to the kind of civilization we hold dear.

"To survive as a nation we must cohere, and the question is how: By living together as free citizens of a republic or by herding together as regimented subjects?

"The tides of revolution are rolling in from all quarters and will wash upon our shores. How firmly can we stand against them? Shall we do so with the voluntary strength of reciprocal relations between all the varying factions of our people, or shall we be compelled to work for the common good by power superimposed upon us?

"This is not merely a question of democracy per se, but of the thing it stands for: The dignity of freedom of the average man.

"What will inspire a true solidarity in our country?

"Only a n a t i o n a l spirit which thinks our way of living is worth the sacrifice, and will subordinate selfish interest to protect it. Do we really want democracy in this country with all its obligations? Or, is it merely a theory we learned about in school? I have no doubt about the answer.

"Solidarity among our people is certainly going to depend upon mutuality of interest, on understanding each other's need, respecting each other's rights, keeping faith with one another.

* * * *

"What of the future of the consumer movement? It has all the earmarks of being permanent, founded as it is on the very sound principle of helping consumers buy intelligently what they need. Important u n d e r normal conditions, and I would say indispensable in a national crisis, when every dollar must be made to count. It is a vital aspect of the total efficiency with which this nation must operate in meeting the heavy demand for defense preparation in addition to civilian goods.

"How will advertising be affected and how will it serve the public under the abnormal conditions which confront us?

"If the World War is any criterion, the volume of it will increase. The demand for consumer goods should grow rapidly as more and more workers are employed in the double job of building munitions and meeting an accelerated demand for civilian goods. Some industries may suffer, due to priorities; some will be short of consumer goods. On the other hand, many may find new markets and new opportunities to use advertising. There will be the need for maintaining good will and trade re-

Officers of the A. G. A. for 1940-1941

THOMAS J. STRICKLER
President

Mr. Strickler is vice-president and general manager of the Kansas City Gas Company, Kansas City, Mo.

He was graduated from Wentworth Military Academy, Lexington, Mo., in 1900 and received his B.S. degree in civil engineering from the University of Kansas in 1906.

He was associated with the U. S. Reclamation Service from 1902 to 1910. In 1911, he became assistant engineer of the Kansas Public Utilities Commission and served as chief engineer from 1914 to 1920.

Mr. Strickler joined Henry L. Doherty & Co., New York, in 1922 and in 1924 was transferred to Kansas City. He was consulting engineer for Gas Service Co. and vice-president or director of thirty subsidiaries in Kansas, Oklahoma and Missouri from 1925-27. He has been vice-president and general manager of the Kansas City Gas Co. since 1927. His record during the war includes service as Captain, Engrs., U. S. A., 1917; Major, Transportation Corps., Oct. 1918-June 1919; and Commanding Officer, Railway Transportation Corps Schools, Angers, France, A.E.F.

In addition to being president, Mr. Strickler has served on many important committees of the American Gas Association and has been a director for a number of years.

GEORGE F. MITCHELL
Vice-President

Mr. Mitchell is president of The Peoples Gas Light & Coke Company, Chicago, Illinois.

Born on March 20, 1888, he was educated at a business college and Armour Scientific Academy. He entered the public utility business in 1909, starting with the Commonwealth Edison Company as a stenographer in the new business department. He became secretary to the president of that company in 1913.

In March, 1919, Mr. Mitchell became assistant to the president of The Peoples Gas Light and Coke Company. He was elected treasurer in June, 1921; vice-president in charge of finance in May, 1924, and president in February, 1930.

He is credited with introducing the therm rate on a major scale in this country. His company has been a leader in the adoption of aggressive sales promotion methods.

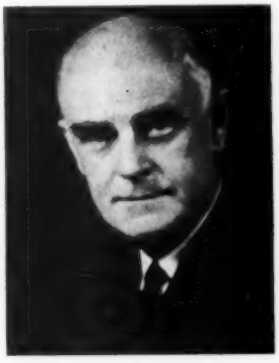
Mr. Mitchell is a director of the American Gas Association and vice-chairman of the Committee on National Advertising.

GEORGE S. HAWLEY
Second Vice-President

George S. Hawley is president of The Bridgeport Gas Light Company, Bridgeport, Connecticut.

He was born and raised in Connecticut. In his early business life he was the official court stenographer of the Superior Courts for Fairfield County. He studied law and was admitted to the Bar in 1915, after which he practiced for a short time. Later he was elected vice-president and general counsel of The Bridgeport Gas Light Company, and has been its president since 1928. He has been identified with many civic and philanthropic projects of Bridgeport and the State.

He is president of the Connecticut Gas Association and the Bridgeport Manufacturers Association. He is vice-president of the Society of Gas Lighting and was recently president of the New England Gas Association and the Guild of Gas Managers of New England.



ERNEST REYNOLDS ACKER
Treasurer

Mr. Acker is president and general manager of the Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y.

He was graduated from Cornell University, class of 1917, and attended Harvard University, Graduate School of Business Administration, in 1927.

He served overseas as First Lieutenant, United States Chemical Warfare Service, during the World War.

After a short period of time with the Yonkers Electric Light & Power Co., Yonkers, N. Y., and the Bethlehem Steel Co., Bethlehem, Pa., Mr. Acker became identified with the Central Hudson Gas & Electric Corporation in 1919 as assistant engineer in the general operating department. He was made superintendent of the Kingston Gas & Electric Company—at that time a unit of the Central Hudson System—in 1921 and held that position until he was appointed general commercial manager of the Central Hudson Gas & Electric Corporation in 1925. In 1932 Mr. Acker became president and general manager of the company, succeeding the late Thaddeus R. Beal.

lations so sorely needed when war efforts cease.

"In a time of economic stress and strain whole new industries may arise, opening up new fields for advertising, as was true twenty years ago.

"From the standpoint of public morale, it will have a genuine role to play. It is the very nature of advertising to cheer people with its intriguing array of goods, styles and fashions. That in itself keeps people's minds off the stark realities of the outside world; gives them a feeling that their own familiar world is still wagging its friendly tail.

* * * *

"Perhaps the present crisis is a blessing in disguise, in building a true democracy in this country, powerful because united, welded by a common danger into a nation which will lead the world, not just in democracy but in respect for the common man—his dignity and freedom."

Allan M. Pope, President of The First Boston Corporation further commented on the world crisis as it may affect our country. He said:

"There is no question in the mind of any man to whom I have talked, whose knowledge of the situation is even fair, who believes for one second but that if hostilities actually begin this country will almost over night be turned into the equivalent of a totalitarian state. All enterprise will be carried on by the state because all profit will go to the state and nobody can afford to be enterprising. War will accomplish over night what has been the trend for some time.

"You cannot expect the golden opportunity to insure central control by government such as engagement in war creates will be lost when every opportunity has been taken advantage of for nearly eight years to accomplish such control. Do not therefore use the argument that an entry into war will save democracy. It depends upon who is running the government after the war is over. I also have yet to see the necessity for fearing attack to drive us into war unless we completely fail to prepare. . . . I have so far found the best arguments for our entry into war, generally speaking, voiced the loudest by men invincible in peace and invisible in war.

"Today, without actual hostilities being entered into by us, you are sitting as pretty as any group of individuals on this poor earth. Hang on to that position and by doing so be prepared to be a nation strong in spirit, strong in arms and strong in productivity so that when war ends, as end it must our friends abroad will have one nation on earth to which to tie that can stand being leaned on and which can lend a helping hand. Without such a nation, chaos is inevitable."

Referring to "a recent Act of Congress which delegates to government the right, under rather nebulous conditions, to conscript industry," Mr. Pope said:

"If industry is to be conscripted, so is labor to be conscripted. Those two items go hand in hand. If we have a general or even partial conscription of industry, we will have a general or partial conscription of labor. Look at Germany, Italy, France, even England. Where can anyone point to the place on this earth where a union labor leader has anything to say or where he is even to be found at all, where a government has taken over industry. Look at France with its Popular Front or New Deal government whose leaders are now in jail on the demand of their own people. What happened to the 40 hour week and the national socialist party doctrines when the government took a real hand in increased production of armaments and later conscripted industry in a big way. The 40 hour week went with the labor leaders—out the window.

"One of the worst things that could happen to this country that would take us back to the Roman galley—not horse and buggy days—would be to have labor, protected as it has been after years and years of struggle, controlled and exploited by a government, thereby losing its voice entirely when confronted by its employer. Facing the possibilities of this situation labor today stands mute except to champion the group that slipped that small paragraph in a Bill so that it looked as though the employer was liable to be soaked when actually it was labor just as much if not more, for in point of numbers of persons affected it would be as 100 is to 1."

The latter part of Mr. Pope's address is published in full in this issue under the title "It Happened in France."

Franklin T. Rainey, chairman of the A.G.A. Industrial Gas Section and General Sales Manager of the Ohio Fuel Gas Company dealt directly with "The Gas Industry's Opportunity in National Defense." In this paper, which we plan to publish in full in our December issue, he said:

"Our greatest contribution will be that of not only furnishing gas to industry, but developing and assisting industry in new and better ways of utilizing our product. This then, will be a cooperative assignment, involving the combined personnel of three great industries; the gas industry, through its industrial sales engineers, the gas equipment manufacturers, and all industries making any specific defense product must all combine their talents to effect with speed and efficiency the desired results.

"Today, because of systematically planned and far-sighted policies adopted by most gas companies, we are fortified with thousands of trained and experienced industrial engineers with well established contacts that have won the trust and confidence of industry. This is not the result of the hysteria of the moment, but rather the result of patient and thoughtful consideration to this policy over the last twenty years, enabling us to understand and help solve the many problems of our customers. This has merited and won the customer's confidence to the extent that now he not only solicits, but expects and demands this assistance in solving his industrial heating problems. The importance of such a changed situation is perfectly obvious to all, and as proof and evidence that it actually exists, may I remind you that although the business index today is far below that of 1929, Industrial Gas Sales are 50% greater than in 1929."

In his Presidential Address, Walter C. Beckjord referred to the disturbed world conditions and to the organization of the A.G.A. National Defense Committee. Mr. Beckjord's address is published elsewhere in this issue.

Dealing more specifically with our own immediate problems, Frank H. Adams, President of the Association of Gas Appliance and Equipment Manufacturers and General Manager of Surface Combustion Corporation told the Convention that "in the past ten years methods of sales distribution of gas appliances have changed. Sales coverage has been broadened through dealer cooperation so that now, so far as I can determine, the majority of appliances are no longer sold by the utilities, as they were ten years ago, but by independent sales outlets. It seems to me this change makes the fullest cooperation between our two associations increasingly important.

* * * *

"The principal policies on which a united front is needed and a better understanding and cooperation will be most constructive are those relating to quality of equipment, price and sales promotional activities. While I mention these as three in-

dividual items — quality, price and sales—there are really the three elements which, in different combinations, make up our merchandising problem for both our appliances and your gas service. The question is really one of the balance between quality and price and a common understanding as to where the emphasis is to be placed in sales.

* * * *

"We have a fine demonstration of the advantages of a common understanding, a cooperative action and a united front in the CP Range Program. This program is important to mention here for several reasons.

"First, it is a definite commitment to place emphasis on quality performance rather than price. I do not mean that you should only sell CP Ranges. I am simply talking about where you place your emphasis. What is the theme of your sales?

"Second, it is a specific plan of cooperation between the manufacturers and the utilities carefully thought out and planned from performance specifications to sales. It is easy for us—for people like me, here—to talk about the need and advantages of cooperation but to mean anything that cooperation must be expressed in a tangible, understandable plan that is workable on as national a basis as possible. The CP Program meets that requirement.

* * * *

"The Space Heating Committees of our respective associations are now working together to see whether a CP Program can be worked out for the central heating appliances and their installation in new houses. There is considerable room for improvement in the sizing and installation of central heating plants—particularly in houses selling for $10,000 and under. A.G.A. Requirements, and similar regulations, have been only partly successful in correcting the evils of cut-throat price competition. It would seem that a program to place the emphasis on performance rather than price, to accomplish this in selling will be far more effective with your customers than any other plan so far suggested. Here our united action on a national basis is the essential element of progress.

"The Committees are also working on plans for a CP Water Heater. Here too one of the essential elements of quality service is a proper installation. This can be improved only by joint action of both the water heater manufacturers and the utilities.

* * * *

"While there has been a great deal of concern over the low annual load factor of the house heating load, it is one of the best services the gas company can bring in the home. It is clearly outstanding in comparison with competitive fuels. It represents the best volume load in the home and, finally, and of perhaps most importance, the use of gas for house heating is the best insurance for the continuing use of gas for cooking, water heating and refrigeration."

F. C. Smith, President of Houston Natural Gas Company, urged the establishment by the gas industry of a laboratory for fundamental research and reported progress in that direction.

Dr. Harvey N. Davis, President of Stevens Institute of Technology, recalled the age-old truth that "the only answer to any economic or social problem is hard work."

"And now, just to make our thinking definite," he said, "let us limit ourselves to one phase only of the hard work I have been praising, namely the hard work that daily goes into the productive and distributive phases of American industry. It is a good example to think about. Certainly plenty of hard work has to be done to keep the wheels turning in American industry. Furthermore the quality or intensity of the work that has to be done, always by management, and often by the rank and file, must be just such as I have been describing. And finally, the cause worked for is to cheapen and increase production. This is a goal that is well worthy of any amount of effort—one that fires the enthusiasm of every understanding mind, and particularly of every engineering-trained mind in the land.

"All this, which every one of you knows quite as well as I do, seems to me to have an especial significance in our national life at this particular time. We seem to be in the midst of one of those recurrent periods in human history when considerable numbers of people apparently believe that there are other and easier ways of getting on in the world besides working.

"This obsession takes various forms under various circumstances. At the moment, in this country, it seems to be taking the form of thinking that prosperity and the good life can best be attained by political reform rather than by maintaining and increasing production. We have devalued gold and forced the repudiation of the gold clause in a host of public and private bonds without stopping to think of the effect of all this on that confidence on which forward looking production so much depends. We have boon-doggled and made work under conditions that not merely invited inefficiency, but often required it, by prohibiting the use of even that minimum of machinery that would have permitted the same amount of willing labor to produce far more for the public good. We have ploughed cotton under and killed pigs in the hope of raising prices. We have distributed a dole with, I fear, more concern for its political than for its economic effect. We have tried to cure abuses in the investment banking field in ways that have well nigh killed activity in that field altogether. We have increased both taxes and public debt to the great detriment of present and future national productivity. And we have so managed the methods of our taxation as to discourage almost completely that adventurous development of new industries on which every period of full employment and every high level of production in the past have rested. Seldom in the last seven years has national emphasis been focussed on getting our coats off and buckling down to hard, self-denying, well directed work. Always the emphasis has been on reform, on a new deal of a sadly depleted deck, on the hoped for efficacy of a long succession of political panaceas or social palliatives. Only when the mass of voters in this country learn that there can be no substitute for hard work and high production as a basis for decent living—only then will decent living be possible in this country or in the world."

Dr. Willis H. Carrier, chairman of the Board of the Carrier Corporation, told the convention that "the gas industry has an opportunity in the field of Air Conditioning quite similar in its major aspects, as was and is your opportunity in the domestic refrigerator, not to mention the more recent developments in commercial refrigeration by gas heat energy."

The final speaker was Elmo Roper of *Fortune* Magazine. His address, entitled "As Others See Us" outlined the results of a survey to determine the popular acceptance of gas service. Mr. Roper outlined his conclusions as follows:

"The first thing I'd like to call your attention to is that, except in the house heating field, gas is no interloper. If possession were nine-tenths of the law in marketing (which it often is not), gas would be in an enviable position.

(Continued on page 78)

Munroe Award to Herman Russell

One of the highest honors within the gift of the American Gas Association was conferred on Herman Russell, president of the Rochester Gas & Electric Corp., Rochester, N. Y., at the concluding general session of the Association's annual convention in Atlantic City, N. J. Mr. Russell received the Charles A. Munroe Award for having made the most outstanding recent contribution toward the advancement of the gas industry. The award was made to Mr. Russell "for his accomplishments of a fundamental and permanent nature in the interests of the gas industry."

The award, consisting of a substantial financial acknowledgment and engrossed certificate, was presented by the donor, Charles A. Munroe, of New York, past president of the Association. The award committee consists of Bruno Rahn, Chairman, of Milwaukee, Wisconsin, C. L. Campbell, Hartford and D. A. Hulcy, Dallas.

Honorable mention in connection with the 1940 award goes to E. Carl Sorby of the George D. Roper Corporation for his excellent work in promoting the use of the gas range.

In selecting Mr. Russell for this high honor the committee took into consideration an individual record which is unsurpassed in the gas industry. It has been said of Mr. Russell that he is "the personification of an ideal utility executive and that his accomplishments made the gas industry appreciate itself and the general public appreciate the gas industry."

Mr. Russell, who was president of the American Gas Association in 1936-1937, had headed many important committees of the Association and completed many difficult assignments. He was chairman of the committee which raised the necessary funds to start the gas industry on its present highly successful national advertising campaign. In 1935, he was chairman of the House Heating and Air Conditioning Committee which produced the report "Economics of Gas House Heating" which developed the fact that large heating loads could be profitably handled by the gas industry.

During the period 1936-1937, coinciding with his presidency of the Association, he developed in his own company a series of studies of the economics of gas and electricity which crystallized the point that the all-electric kitchen idea was not to the interest of either the customer or the company and was profitable only at rates averaging much higher than the cost of gas for such service. To prove that this was a national and not merely a local situation, he presented papers in many parts of the country substituting local rates to prove the points developed in his Rochester study. This work was of far-reaching significance to the entire gas industry.

Mr. Russell has devoted most of his professional and business career to gas and electric public utility industries. A graduate of the University of Michigan in 1898, he took up post-graduate work in Chemical and Gas Engineering, receiving his Master's Degree in 1900 and winning the first scholarship established by the Michigan Gas Association.

He entered the public utility business immediately on leaving college and advanced steadily in his work, first with the Detroit Gas Company, then the San Francisco Gas & Electric Company and later for the gas company in Cincinnati.

In 1905, he became assistant superintendent of the gas works of Rochester Railway and Light Company and remained with that company and its successor, the Rochester Gas and Electric Corporation until the present. He was made superintendent of gas manufacturing in 1906, assistant manager in 1914, general manager in 1919, vice-president and director in 1922 and president, director and general manager in 1929.

Herman Russell receives Munroe Award from the donor

Personnel Practices Award of A. G. A. Won by R. H. Field

Reginald H. Field, of Shreveport, La., senior engineer of the United Gas Pipe Line Company, was the winner of the $50.00 annual award established by the Personnel Practices Committee of the American Gas Association for the outstanding student in the Natural Gas Extension Course at the University of Kansas. The announcement was made by Dr. C. M. Young, head of the Department of Mining Engineering at the University, who had charge of the course. The award was presented today to Mr. Field by H. L. Donaldson, of Pittsburgh, Pa., chairman of the Committee on Personnel Practices at the meeting of the Natural Gas Section of the Association during the annual convention in Atlantic City, N. J.

Reginald H. Field

(Continued on page 78)

A 10-ton bite

...or a 10-pound nibble!

THE SECRET ? CONTROL

The modern "clamshell" shovel gulps tons of earth in one snap of its mighty jaws. Yet so delicate are the *controls* that the operator is not boasting when he says he can pick up a single brick.

Accurate heat *control*, so important in top-burner cooking, reaches new heights with the Harper Burner System. As a result, it has made possible new and better methods of cooking—daily is demonstrating to more women that *gas* is the perfect cooking fuel.

Copr. 1940, Harper-Wyman Co.

CONTROL *is the secret here, too*

● The Harper Burner System is a patented invention whereby each of the burners on the range is actually 2 burners in 1 . . . a burner within a burner . . . both operated and controlled by a single handle.

This arrangement affords a high-speed STARTING BURNER to *start* foods boiling and for fast frying . . . plus a small, central, economical COOKING BURNER for *maintaining* the cooking. The COOKING BURNER can be used entirely independently of the STARTING BURNER. No other top burner possesses this vital advantage — which insures easy, accurate control: just the right heat for every type of top-burner cooking . . . every time.

HARPER-WYMAN COMPANY
8562 Vincennes Avenue, Chicago, Ill.

HARPER BURNER SYSTEM

HARPER BURNER SYSTEM

Demonstrates GAS at its best

SEE OTHER SIDE OF THIS PAGE

"THE HARPER BURNER SYSTEM KEEPS US WHOLE AND WHOLESOME!"

FACT:

The secret of success in cooking vegetables is to "boil them gently". Otherwise they reach the table in a soggy, tasteless condition, literally boiled apart. Also, a goodly share of important vitamins may be lost by too rapid boiling and too much water.

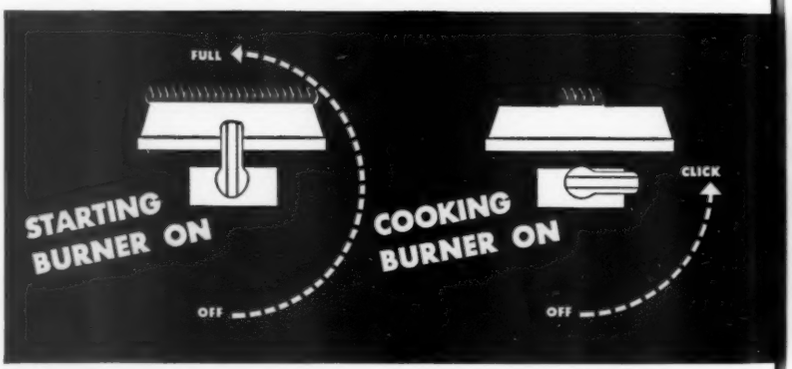
This trouble can be easily corrected with the Harper Burner System. For it gives far more accurate heat *control*, and is adjustable to lower heat levels than ordinary top burners.

REASON:

Only a little water—a cupful is plenty—is needed to cook vegetables, *when the proper amount of heat is used.* After the water is brought to a boil by the big Harper STARTING BURNER, the small, economical COOKING BURNER takes over the remainder of the cooking. It will maintain the water at the boiling point of 212 degrees—"boils them gently".

BENEFITS:

No danger of the vegetables scorching or burning dry with the COOKING BURNER flame. Very little water is evaporated, thus saving gas because less water must be heated. More of the vitamins and minerals are retained because less water is present to dissolve them, and over-boiling is avoided. There is no need of constant pot-watching.



The Harper Burner System provides a burner within a burner. The diagram above shows how the COOKING BURNER operates entirely independently of the STARTING BURNER. Yet both are controlled by the same handle.

We shall be glad to send you, without cost, two booklets that tell the complete Harper Burner System story . . . "Modern Methods of Top Burner Cooking" and "The Greatest Cooking Discovery in 40 Years". They should be valuable to anyone interested in the promotion of gas cooking and gas appliances. *Harper-Wyman Company, 8562 Vincennes Avenue, Chicago.*

SEE OTHER SIDE OF THIS PAGE

HARPER BURNER SYSTEM

HARPER · BURNER SYSTEM

Presidential Address—The Gas Business In the Modern World

By
Walter C. Beckjord

President, American Gas Association
Vice-President and General Manager,
Columbia Gas & Electric Corp.,
New York, N. Y.

WALTER C. BECKJORD

IT IS my obligation as president of the American Gas Association to review briefly for the Convention, the major events that have transpired in the industry during the past year of my administration, and to endeavor to interpret them to this meeting as to the results accomplished and the effect they may have on our future well-being.

We are meeting here this week for the express purpose of gaining knowledge of the accomplishments in our industry for the past year, of finding out better ways to do things, to improve our status and to adapt ourselves to the constant cycle of changing conditions in this country and abroad, in order to keep our operations on a stable basis, to improve our service to the public and to increase our sales.

This is a pretty large program, and I fully realize the difficulties involved in attempting to plan for a future in such uncertain times as these.

. . . . . .

The industry has shown great progress over the years, starting out with a small beginning some 125 years ago with the use of gas manufactured from coal for illuminating purposes only. Natural gas, though known in this country many years ago, was first put to practical use for illuminating in 1824, and for commercial use in 1840. So, the natural gas industry has had 100 years of useful service to the people of this country.

It is a matter of interest in studying the major industries of the United States, that the railroads did not start until 1827. Nothing very exciting happened in the gas industry until 1882, when the electric industry was started with the completion of the Pearl Street Station in New York City, which had a devastating effect on the gas business as of that time. This developed, however, the resourcefulness and courage of the men leading the gas industry so that cooking, water heating, industrial and commercial use, and then house heating and refrigeration came along, and now air conditioning.

The growth over the years, after the turn of the century, brought tremendous volumes of gas sales for other purposes than domestic use, and while there has been some recession in domestic business due to changes in habits of living, with the development of the automobile, apartment houses, and development of suburban life, in the main the industry has shown continuous advance upwards until today the sales are almost at their peak in both the manufactured and the natural gas industries. There has been a change in the trend of domestic sales caused no doubt by the development of refrigeration and house heating, but there is no question but that competition today is keener and stronger than it ever was before, and any tendency to sit complacently back and feel we have done as well as we can, should be promptly curtailed.

The total sales of manufactured gas for the 12 months ending August 1st, 1940 were—383,903,300,000 cu.ft. and for natural gas, for public utilities and electric boiler plants, 1,393,432,600,000 cu.ft. This represents an increase of 8.5% over the preceding year and is a very healthy increase, including industrial and domestic use of gas. The figures from the Bureau of Mines for 1938 show that gas used for carbon black and in the field amounted to approximately 1 trillion additional, making a total of approximately 2,400,000,000,000 cu. ft. Production of coal as of today is equivalent to about 12,000 trillion B.t.u. while natural gas supplies 2,500 trillion B.t.u. or about 20%. Total heat distributed in the form of natural gas is approximately seven times that distributed in the form of electricity.

The advertising program fostered by the Association has been in effect for five consecutive years, and a total of $1,800,000 has been spent since its start. This has met with universal approval on the part of the industry and it is bringing about a greater gas-consciousness in the minds of the public and our customers than ever before. The long-term objectives of this campaign have been closely adhered to by the Committee on National Advertising, and there has been no diffusion of effort. The committee has done an outstanding job within the limits of the funds made available for this activity.

. . . . . .

The Cleveland Laboratories are still functioning very successfully and efficiently on the testing of appliances, formulation of new ideas in design of domestic appliances, research on many subjects, such as, mixed gas, improvement in house heating and water heating equipment, and now air conditioning. It is particularly gratifying to report that the closing of the Laboratories' present fiscal year, which marked the 15th Anniversary of their founding, represented the most active period of all the operations of both the Cleveland and Pacific Coast Laboratories.

The Pacifice Coast Branch building, the site for which was picked out a year ago last spring, was completed and placed in full operation in November 1939. This provides three

The principal parts of the Presidential Address delivered at the A.G.A. Annual Convention, Atlantic City, N. J., Oct. 8, 1940.

times the working space afforded by the leased quarters, and makes available the most modern testing facilities for the rapidly growing Pacific Coast area. It is a building of which the industry may well be proud, and it is a monument to the coordination of the manufacturers and the utilities on the Pacific Coast working closely together with the Cleveland Laboratories and the American Gas Association.

Over 3,400 appliances and accessories were tested in the combined Laboratories in the last year, representing an increase of more than 20% over the preceding year and making an all-time peak. Over 17,000 separate and distinct models are shown in the Laboratories' Directory, representing the products of over 400 manufacturers.

In the research program sponsored by the American Gas Association at the Cleveland Laboratories, over 250 separate research projects have been covered at a total cost of approximately $1,000,000, and projects are now under way costing approximately $70,000 a year. Definite plans are under way for improvement in water heaters and house heating equipment along similar lines to that of the CP range. The matter of fundamental research has been actively discussed for the past year by a committee appointed for that purpose, which is preparing plans for a fundamental research institute to be submitted in a report before this Convention. The plan is very comprehensive, far-reaching, and should accomplish excellent results for the industry.

The CP range which was developed and made possible by committees of the American Gas Association, has been sponsored by a great majority of utilities all over the country, and active and promotional selling campaigns are going forward. There are some 150,000 units now in service and more and more are being sold every day. It has received customer acceptance and proven to our competitors that in this domestic cooking appliance we have a unit that has no equal in this country.

Research in improving the use of gas in utilization equipment in the home has progressed steadily during the year. The Committee on Domestic Gas Research, which started its work three years ago in ranges and water heaters, has been aggressively conducting the work at the Cleveland Laboratories, and new material developed has been made available through the medium of technical bulletins on each subject. This included research on Atmospheric Gas Burner Design, which was published in the last month. These data are available and is used extensively by designers, laboratory workers, engineers and service men who are connected with the gas utility industry, as well as the gas appliance and equipment industry. These data soon become an important part of standard technical reference and are used throughout the years.

This committee has also done work in cooperation with the American Society of Heating & Ventilating Engineers in research on summer air conditioning at the Research Residence located at the University of Illinois. The Executive Board has authorized continuation of the range, water heater and atmospheric burner projects during the coming year, and research in direct and central gas space heating.

The Industrial Gas Research Committee has had a very busy year, and is working on five distinct projects at the present time. Infra-red low temperature heating for drying and baking operations has been gone into in great detail and data presented at the recent Industrial Gas Sales Conference. A bulletin has been published on research in combustion of gas with reducing atmospheres containing much new and valuable material.

At the Pittsburgh Laboratory of the American Society of Heating and Ventilating Engineers, an interesting project is under way on the comfort standards for summer air conditioning. Research has been going forward at the Laboratories on a small mechanical toaster suitable for use on lunch counters, a field in which we have not been able to meet competition. This work is under way and it is hoped it will be made available for commercial distribution in the near future.

Developments in the field of radiant heat at high temperatures are being made, which may be available for applying radiant heat to bisque firing. This should bring down the unit cost of bisque firing to a point where such business can be taken on with all kinds of gases, and gives every promise of eliminating the age-old use of ground flint with its attendant silicosis hazards. This will mean a definite contribution to the art in the ceramic field.

The Sales Council, which is a coordination of the Industrial and Commercial Sections, has been formed during the year and has now taken over active promotional and sales effort of the industry. The consolidation of these two sections, which has been felt advisable and under discussion for some years past, is now accomplished and there is no question but that more effective sales effort than ever before will be the result for the industry.

The Association has participated in the World's Fair of New York two years, and both exhibitions have been successful. There has been a marked change in the exhibit this year, putting in more showmanship in accordance with the spirit of progress of the Fair. . . . . .

A Committee on National Defense has been organized to co-ordinate with the proper bureaus of the Government to assist in every way in all endeavors for national defense. Several meetings have been held and contacts made with the National Defense Commission in Washington, to express our willingness to be of every possible assistance and to exchange ideas and develop projects constantly in connection with this bureau in Washington.

. . . . . .

One of the most important activities of the Association is that of the Rate Committee, which has been organized for the past twenty years. This provides opportunity for full recognition of the problems arising in the promotion and sale of the service supplied by the gas industry. To quote from the report:

"The regulation of the industry under the public service legislation of the various states and the Federal Government, recent additions to and changes in this legislation delegating additional powers of supervision and regulation, and broader interpretation and their powers under public service law by the administering commissions, have produced new questions for the attention of this Committee that are of increasing importance with each succeeding year."

I honestly urge that careful attention be given to the complete report of the committee, because it gives thorough discussion of many questions of immediate and important interest to the industry, and vital to our progress. During these times when we are up against the serious problem of downward trend of domestic sales, we must study every angle of the subject so as to be fully aware of what member companies are doing in this regard, because the experience of others is invaluable to all of us.

. . . . . .

The Home Service Department has done and is doing an outstanding job and the theme of their program this

year is "Home Service in the American Way of Living." They will have a real opportunity to point their demonstrations and contacts with customers toward what most American homemakers will be thinking about this year—the economic problem following in the wake of the European conflict. There are 600 Home Service Departments in the gas utilities throughout the country employing over 1300 women, and they are giving excellent support and service in the sales programs of the industry, not only in direct practical application of increased sales and service but they are doing a grand job in selling the industry to the public, something in which perhaps the utilities have been remiss in the past. The Home Service group can also be of material assistance in interpreting to the industry how our customers feel about us. This is a most essential work and should be done.

. . . . . .

I want to pay tribute to the very successful work that the Servel Company has done in promoting the gas refrigerator. Starting out about twelve years ago with a unit which required water cooling, and much servicing, this company has improved its unit through research and sales efforts, until now it is an air-cooled unit requiring very little, if any, servicing, and to date something over 1,500,000 gas refrigerators have been sold, which is nearly 10% of the total gas customers. This record is all the more noteworthy when it is considered there are over 13,000,000 electric refrigerators in use in the country, sold by the most powerful selling organizations ever developed, and there are countless dealers and jobbers in the country actively pushing the sales of these units, whereas, in general the gas refrigerators are only sold by the utilities themselves. The sale of gas refrigerators helps immeasurably in holding the kitchen for gas. It has proven that there is romance in the use of gas in the home, and thus is a powerful selling argument. The gas industry is fortunate in having a powerful organization such as Servel, able to carry on its research and development throughout the years, and increase its selling efforts to a point where it is in the replacement market for competing boxes. It has established a place in the sun.

In this connection, I want to pay tribute also to the work of the manufacturers in furthering the progress of the gas industry. During the past ten years they have drawn on their capital to conduct research and improve equipment, and many of them have had difficulty making both ends meet over these years, many of which were clouded by depression. Without their able help and assistance the gas industry could not have made the progress it has, and we owe them an undying vote of thanks for the effective work they have done. Let us not forget the work the manufacturers have done in our relations with them, and encourage and help them in every way possible. A special committee on Co-ordination of Appliance Requirements has been appointed and is now busily engaged in trying to standardize the various specifications for appliance equipment, which will simplify and reduce the burden on the manufacturers in attempting to meet the specifications promulgated by the various company laboratories. This will materially reduce the expense of cost of construction, and will be of marked benefit to the industry as a whole.

The gas industry has come to realize the value of proper dealer relations, and the flood of legislation spread around the country several years ago prohibiting utilities from selling appliances, has now been taken care of. Dealer and plumber sales co-ordination is a part of our sales effort throughout the country and a great deal has been accomplished, particularly on the Pacific Coast where they have done an outstanding job in dealer relations.

This is an age of market surveys and polls, and the Gallup poll is well-known to every one. The problems of the gas industry are such that it is well to secure all the factual data we can in regard to the possible markets, and the process of sampling public opinion is accepted as an American institution. This process is not new. It has been done for years, and the market survey is simply a method of obtaining by direct contact with the consumer those facts we all recognize are essential to a sound determination of rate and sales policies.

In this connection, we should know the size of the potential market, the nature and strength of the competition, trends in the use of various fuels, and the bases of consumer preference. Factual observation such as this frequently determines that some hidebound opinions we had in the past are not correct, and in effect, we substitute fact for opinion. The use of the market survey has accomplished definite results, and there is no question but that an intelligent application of the market survey will be exceedingly helpful in retaining existing business, in regaining lost business and in determining future trends.

The question of customer relations is one that is always paramount in our industry, and I think it is worthy of even greater attention. Many in the utility business probably do not realize that 60% of the people have incomes of $100 a month or less, and 82% have incomes of less than $2,000 a year. In many cases the customer has more money invested in the equipment to burn gas, than the utility has in the equipment to serve him, and this is a factor that should be taken into consideration in studying a customer's problems. The question of balancing the budget is important not only to the nation, but to companies and individuals as well, and when you stop to consider the manifold expenses the average individual has to take care of, you can realize the important part the bill for utility service is, and this should be considered in its practical effect on the customer as well as its aspects as producing revenue for the industry.

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The question of new markets brings forth the problem of air conditioning, which is now very much before the industry, and every effort should be made to see that this is fully developed and promoted by all the utilities because it has long since passed out of the laboratory stage and must be tried out in acid test in customer installations before it can become a commercial success.

It is quite obvious that residential air conditioning means a desirable summer load and while it will not entirely offset the winter peak, it is certainly desirable business. It amounts to about 40 M to 50 M a year which is a fine addition to domestic business. In our effort to obtain this business we will undoubtedly have the co-operation of the electric industry because it has come to realize that air conditioning for three months is not a compensatory electrical load when the large investment cost necessary to supply it is taken into account. You cannot condense a year's fixed charges into three months. Many electric companies find their peak has shifted from winter to summer with a non-compensatory income, and many combination companies are actively engaged in pushing gas for air conditioning, using electric motors for the power end of the load.

There has been a large development in natural gas transmission lines culminating in the completion of the line to Detroit of 1200 miles, which is about the longest in the

COMPARATIVE INVESTMENT IN VARIOUS INDUSTRIES

Industry	*Total Revenue*	*Total Investment*	*Total Employees*	*Investment Per Employee*	*Investment Per Dollar of Gross Revenue*	*Year*	*Miscellaneous Statistics*
Railroads	$3,189,562,600	$25,500,465,000	1,090,000	$23,390	$7.99	1891	546,762,000 Pass. per Yr.
						1920	1,269,913,000 " " "
						1938	454,508,000 " " "
Petroleum	4,246,237,000	6,756,202,000	250,000	27,025	1.59	1861	2,479,000 Bbls. per Yr.
						1929	1,007,323,000 " " "
						1938	1,213,200,000 " " "
Steel	3,356,668,000	4,703,755,000	613,700	7,665	1.40	1871	389,799 Long Tons
						1918	56,433,473 " "
						1932	13,681,162 " "
						1938	28,350,000 " "
Motor Vehicles*	2,971,027,600	1,639,631,000	517,000	3,171	.55		
Telephone	1,052,658,000	5,119,062,900	257,400	19,888	4.86	1895	339,500
						1929	20,068,000
						1938	19,885,000
Electric Power	2,207,108,700	14,048,706,000	275,080	51,071	6.37	1902	2,507,000,000 KWH per Yr.
						1938	132,000,000,000 " " "
Motor Bus	295,004,000	276,248,000	29,750	9,285	.94	1930	1,778,000,000 Pass. per Yr.
						1938	3,961,510,000 " " "
Airlines	52,678,000	95,046,000	9,450	10,063	1.80		
Electric Railway	768,670,000	5,857,513,000	182,170	32,155	7.62		
Anthracite Coal	234,668,000	513,618,000	142,800	3,597	2.19	1821–30	66,000 Tons per Yr.
						1917	99,612,000 " " "
						1938	46,099,000 " " "
Bituminous Coal	773,265,000	1,741,305,000	447,130	3,894	2.25	1821	75,000 " " "
						1918	579,386,000 " " "
						1938	344,630,000 " " "
Natural Gas	423,329,000	2,441,840,000	64,000	38,153	5.77	1939	2,263,000,000 MCF Peak
Manufactured Gas	365,267,000	1,967,490,000	67,600	29,105	5.39	1939	362,590,000 " "
						1929	524,115,000 " "

Gas 124 Year

1810 Population	10,000,000 or 4.5 persons per sq. mi.	Gas Appliances Now in Use	1939 16,500,000 Gas Ranges
1940 "	132,000,000 or 41.0 " " " "		1929 14,500,000 " "
	16,500,000 Customers	Gas Refrigeration	1,500,000
1860 Sales	4,000,000 cubic feet only	Central House Heating	Over 900,000

Freight Tonnage	1891	692,446,000 Tons per Yr.
	1918	2,477,092,000 " " "
	1938	1,482,504,000 " " "

*Includes Automobiles and Trucks.

country. To those who have followed the development of transmission lines, it is obvious that industrial and interruptible gas must be obtained in order that a line may become self-supporting, because the load factor of the domestic business is such that it cannot support a transmission line without some supplementary load. Load factors of well over 90% have been obtained on some transmission lines, by the development of this type of industrial business and further reductions in domestic rates have been made possible in this way.

Transmission lines have been developed as a result of technical improvement not only in building lines, but in constructing compressor stations, and all this has made possible greater application of gas service in the field of house heating, which was formerly called undesirable and dangerous to load factor and to peace of mind on cold days. It is possible through packing the lines and storage of gas, to offset this peak load, and saturations of house heating gas of 10% or more are becoming common. It is necessarily competitive business but up to the point where it can be taken care of by these methods it certainly adds to the increment profit of the utility.

I have presented numerous discussions at spring conferences and various meetings on a problem I consider one of the most important, and that is the ratio of gross earnings to invested capital. It has taken an undesirable trend in the last few years, which is a dangerous situation because unless the fixed charges on our plant account can be kept down, certainly we are going to become a target for competing enterprises which can be operated on less capital investment.

A study of statistics from the larger gas utilities has indicated many of the additions to capital have been made not to the capital account but for replacements. In fact, over a 10-year period some of these statistics would indicate only about one-quarter of the new money has actually gone into capital investment. This is a serious situation, and perhaps insufficient reserves have been accrued to take care of the wear and tear and obsolescence of the property. This is a matter which should be given very careful study.

Statistics for a number of companies indicate a ratio of $5 investment for $1 of gross, which means that it takes 5 years to turn over the capital invested. The railroads have an investment of $8 per $1 of gross and it is obvious they are not paying their way. They are carrying fewer passengers today than they were 50 years ago, and while this is not the principal part of their revenue, it was at one time a desirable part of their load, which has been lost to competing methods of transportation. A ratio as high as this carries with it too great a burden of fixed charges, under which no industry can survive without Government subsidy.

It is obvious the question of capital turnover is important in any business enterprise. The automobile business has the quickest turnover of any with about a 50c investment per $1 of gross, and the sales activity is the greatest of all industries in the country. It is constantly in search of new ideas and spends money on research and never hesitates to change its product to improve it, and continues to give greater value for the dollars spent each year. This is a complete epic of business success.

There are certain basic laws of economics, which I believe cannot be violated with impunity, and the most important of these is that you cannot spend your way into prosperity. In our business under the capitalistic system, we must spend money to create the ability to render service,

but you cannot spend money for monuments or plant expansion without disastrous results. The tendency of the rulers of ancient Greece and Rome to build monuments, is what ruined their countries, because the savage tribes that came from the north did not care about statues or Roman baths, or mausoleums. They were in search of food and took the most direct method of getting it.

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In considering the future of the gas business we must bear in mind the fundamental basis of all civilization is heat and the gas industry is in a better position to supply controlled heat, susceptible of innumerable applications to industry and domestic use. The status of the automobile industry today would not be what it is without the application of gas heat. The development of high-speed steels, of rubber tires, in heat treatment of materials, in annealing, galvanizing, etc., shows the extent to which the gas engineers have improved these methods, and America today ranks first as an industrial nation.

There is very little that is new in all I have been saying. It is largely a restatement of many discussions that have occurred in the past in all parts of the country, but I would feel I had been remiss in my duty if I did not point out a matter which I consider to be of vital importance to the industry, and the American Gas Association. Over the years many industries have risen to dizzy heights, and fallen into the discard through lack of proper management, through change in ideas and habits of living. Street cars have largely gone by the wayside, the horse and buggy days are over. The automobile, the radio, telephone, and all the manifold applications of industry to modern life, have become the "American Way of Living," and we would not go back from it one iota. We want more instead of less.

I want to call attention to the money that is being spent for promotional effort, research and Association work for this gas industry, and I consider it vital that each and every one of you give careful thought to this because unless we continue and carry on efforts for sales, promotion and research, the industry is bound to suffer. The annual budget of the American Gas Association for 1940 was $437,000 and in addition $450,000 has been spent for national advertising. The Cleveland Laboratories representing an investment of over $500,000, has an annual budget of $250,000, and in addition to this about $70,000 a year is spent for research to improve domestic and industrial appliances and burners. This is a total of about $1,200,000 and the combined gross income of the industry, both manufactured and natural gas, is $838,000,000, so we are spending only about 15/100 of 1% of the gas industry's revenue for Association work. The gas industry spends less than 1% of its revenue for advertising whereas the automobile industry spends on the order of 17%. The gas industry has a combined investment of $4,500,000,000 which makes it the sixth largest industry in this country.

A group of manufactured gas companies representing about 52% of the total meters, spent for the year 1939 $7,700,000 for new business expense including advertising, supervision, salaries, etc. This was approximately 3.9% of the operating revenue. A group of natural gas companies representing about 33% of the total natural gas meters, spent little short of $3,000,000 which was 2.1% of operating revenue, so the combined companies spent about $10,000,000 which is less than 3% of the gross revenue for promotional work. I submit this is not enough to take care of the development expense of an industry the size and importance of the gas industry, and definite means should be provided to improve this situation. Unless this is done our sales effort is bound to suffer, and no industry can afford to let its sales bog down during times such as these. Competition is going to be keener and the scramble for the consumer's dollar is going to be more intense as time goes on.

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I want to express my appreciation for the complete co-operation of the Association staff, the officers of the American Gas Association and geographic associations, committee members and members of the Association as a whole, who have all responded so generously in time and effort, in advancing the cause of the gas industry.

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And, now I am approaching the end of my story, and will deliver my responsibilities into the hands of my very capable successor, but before closing I would like to quote from a letter just received from Sir Francis Joseph, president of the Society of British Gas Industries, who had hoped to be with us today, but is prevented by the war:

"The British Gas Industry is making an important contribution to our War Effort. Some day when the details are published it will be found that this old industry has once again justified the public confidence it enjoys. It is not resting on its laurels. From the national standpoint its job has been well done.

"Lately, we have been having a number of raids during the day and night. We feel that they will go on. If they do it will not make the slightest difference to our determination to see this job through to the end. There is only one end as far as we are concerned—we are going to smash Nazism and what it stands for. To do that we will risk everything we possess because it is impossible for us to live except we breathe the air of freedom.

"May I be permitted to state our position.

"We are all right for food—the nation is splendidly fed. We are all right for courage—it was never greater. Best of all we are all right for staying the course because we are certain we can last longer than our enemy. Above all things we know we are fighting for eternal principles and to preserve the generations who will succeed us, so rest assured we will never quit until we have made certain that Democracy is the victor."

These are brave words both from an industry standpoint, and from a national standpoint, and reflects the undying spirit that will carry any nation through any crisis. I feel sure the tradition of the white race is safe in hands that can express their determination in such words, and I know all of us here will say "Amen" to that.

Let us face our own problems with that same rare courage. Let us do things and not simply talk about them. Let us carry on along the line we know to be right and sound, even though it involves sacrifice. Nothing can be done without effort and all effort requires some sacrifice. I have every confidence in the future of the gas industry, more now than ever, because we have survived many vicissitudes and much progress has been made in the art of living. We have shown ourselves capable of surmounting these obstacles and can carry on to a far greater degree if we but have the courage and faith to do so. If after complete discussion we can arrive at conclusions for the betterment and progress of the gas industry, by all means let us act on those conclusions and not simply file them away for future reference. There is no stopping—the wheels of progress never stand still.

The gas industry has all the fundamentals for economic success. Its product represents the most flexible and most economic application of heat, wherever heat is used, and with this foundation and the ability, energy and courage to engender new ideas by application, by utilization, by research, the gas industry can continue to go forward and meet all competition successfully as it has in the past.

It Happened in France

Part of an address by Allan M. Pope, President, The First Boston Corporation before the American Gas Association at Atlantic City, October 9, 1940.

I AM NOW going to give you some facts about France that in time will be in history books. Think over them well and draw your own conclusions from them. They were given to me, personally, by Frenchmen who witnessed the events with their own eyes, which same eyes were filled with tears as they told me of the tragedy they had seen.

France after the last war became satisfied. The French people set out to enjoy comfortable living in assured security. The army, still filled with men of courage, lulled itself into the doze which lack of animation fosters. Then France built the much heralded Maginot Line, which politicians promised the people was complete protection but which every military man I have ever talked to in the last few years knew could be pierced any time a German army wanted to sacrifice the men with which to do it. The security promised through the Maginot Line ruined the army and France!

The people, softened by this sense of security, wanted the ease which they had not themselves yet earned and asked it be given them by the state. Politicians were at hand to promise everything. They promised shorter working hours and gave the people the 40 hour week. They promised higher wages which they increased 50%. Then, manufacturers and others had to increase prices to pay for these promises. The cost of living went skyrocketing and as always happens, wages failed to keep up with this cost. The standard of living went down and the poor suffered. Every form of social security then was promised and tried out. Some people cried for more. More was given and the cost of government went up, taxes went up, the debt went up, prices went up and the standard of living went down and the poor suffered.

Then the threat of war came.

While attempting to supply still unearned benefits to the people from the coffers of a bankrupt government, armaments had been forgotten. Planes, tanks, rifles, guns were needed and now there were not enough men at 40 hours a week to build them.

War came!

They abandoned the 40 hour week. They abandoned promised benefits. They tried to rebuild in a short time the armament plants that promises guaranteed would never be needed. Too late!

They changed Premiers! Too late!

The private armaments plants, that could not exist under taxes, governmentally curtailed profits and too high labor costs, were given subsidies and loaned money by the government at easy rates to keep them alive. Too late!

The government took over important armament plants — conscripted them — and added to the already enormous governmental bureaucracy in order to try and run them. Too late! Inefficiency became rife.

The private armaments plants found fifth column workers in their employ. They discharged them and because labor was scarce and because Russia's communism had permeated the ranks of the bureaucrats the government rehired these men and put them to work in *governmental armament plants.*

The enemy appeared at the border of France!

Politicians losing confidence in the army tried to plan campaigns. Politicians made decisions regarding the defense of Belgium. The battle was lost!

The people screamed for leaders. They tried new ones while the Germans broke through the Maginot Line.

Then every bureaucrat tried to lead in his own particular field. Soldiers gallantly fought in desperation for France with odds against them in armaments as high as 15 to 1. Still the Germans came on! Instead of one there were now hundreds of government leaders, scared out of their soft beds, howling commands, and confusion reigned. *That* was the end.

Where are the Premiers who promised, yes, guaranteed the people, for political reasons, every form of social and physical security? They are in jail—put there by their own people.

Where are the people of France? Half of them are living in starvation under a foreign tyrant. The other half are in misery, crushed perhaps forever.

On the other hand what did Winston Churchill promise the people of Great Britain? He promised more work and greater sacrifice. Where is he today? He is the magnificent head of a united people. Where are his people? They are working and sacrificing as he said they must and knew they would, yet with their heads up, giving blow for blow to that same enemy and thereby commanding the admiration of the entire world—friend and foe alike.

I hope you will think over well what I have said.

There is no man on earth, no matter how high his office, who can guarantee you social security or security against an enemy from without and have that guarantee worth the microphone it was spoken into. You alone can guarantee it, and if you work and if you sacrifice enough, that guarantee will be worth something, if I know anything about the American people.

You can spend 10, 15, 20 billions of dollars on armaments for defense, but don't you let that lull you to sleep as did the Maginot Line lull the complacent French. Every dollar spent for armaments can merely add to the store of captured arms by a foreign foe if *you*, who are listening tonight, do not by your work and by your sacrifices pledge yourselves to keep this country from being torn asunder from within, from being divided by politically expedient promises to some and politically expedient threats to others.

We are, every one of us, in the self same boat. We must, every one of us, rely upon ourselves to save ourselves, our families and our country, for no government by itself can ever save us—it can but enslave us.

More Profit in Blaw-Knox *Conditioned* GAS!

Can you measure the loss of good will when service fails due to dust in the lines? How many men, how many trucks, for example, must you assign to answer service calls? Blaw-Knox Gas Conditioning is the answer, providing—at low cost—a positive insurance against service interruptions due to foreign matter in the gas; protecting your equipment from the erosive effects of entrained dust with fully engineered gas conditioners which will do the kind of a job you want. Bulletin No. 1578 tells you what Blaw-Knox Gas Conditioning equipment does and why it is preferred by leading operating engineers the country over. Ask for it.

Up go sales of appliances, down go service costs when GAS does its job unfailingly. As engineers know, nothing but CLEAN gas is dependable . . . especially when used with modern appliances which have smaller apertures and more delicate mechanisms.

A few of the many advantages of Blaw-Knox Gas Conditioning

1—High capacity; gives full value per dollar invested.

2—Gas is thoroughly cleaned, no half measures. Dust and other foreign matter is dynamically forced into intimate contact with washing liquid.

3—Delivers perfectly clean, dry gas (if desired, equipment will resaturate with oil or water vapor).

4—Pressure losses cut. Very little loss in contacting and separating sections.

5—Dust and dirt are completely removed from gas flow.

6—Blaw-Knox Gas Conditioners are the result of many years' research and experience in dust removal and separation of liquids from gas.

BLAW-KNOX
GAS CONDITIONERS

BLAW-KNOX DIVISION of Blaw-Knox Company • FARMERS BANK BLDG. PITTSBURGH, PA.

NATURAL GAS SECTION

E. F. SCHMIDT
Chairman

MONDAY, October 7th was Natural Gas Day at the A.G.A. Convention. Meetings were held at the Ambassador Hotel in both the morning and afternoon. At each session there was one important paper and a group of short committee reports. Ample time was thus available for discussion of the paper.

Elmer F. Schmidt, Chairman of the Section and Vice-President and Operating Manager of Lone Star Gas Company, opened the meetings with an outline of the progress made during the past year.

The Main Technical and Research Committee, under the Chairmanship of H. C. Cooper of Pittsburgh, produced the following Sub-Committee reports:

Gas Well Deliveries, presented by E. L. Rawlins in the absence of the Chairman, N. C. McGowen, President of United Gas Pipeline Company. Gas well condensates and high gas-oil ratio wells have occupied much of the Sub-Committee's attention during the past year.

Pipe Line Sub-Committee, presented by its Chairman, Harry D. Hancock, President of Gas Advisers, Inc. Gas hydrates was the subject particularly dealt with.

Gas Measurement Sub-Committee, presented by its Chairman, Thomas R. Weymouth, Vice-President of Columbia Gas & Electric Corporation. The effects on meter accuracy of pressure pulsations, and methods of improving conditions were the subjects particularly covered.

The paper at the morning session on the "Liquefaction, Storage and Regasification of Natural Gas for Peak Loads," by Dr. R. W. Miller, Research Director, Peoples Natural Gas Company and Hope Natural Gas Company, and John A. Clark, Assistant General Superintendent and Chief Engineer of the Hope Natural Gas Company, was presented by Mr. Clark. This paper is reprinted in full elsewhere in this issue.

The afternoon session opened with the following committee reports:

Industrial Natural Gas Sales Committee, presented by its Chairman, Franklin T. Rainey, Sales Promotion Manager, The Ohio Fuel Gas Company.

Domestic Natural Gas Sales Committee, presented by its Chairman, Davis M. DeBard, Vice-President, Stone and Webster Service Corporation.

Engineers' Committee on Industrial Gas Data, presented by its Chairman, George M. Parker, Mississippi River Fuel Corporation.

The A.G.A. Award—University of Kansas Natural Gas Extension Course, established by the Personnel Practices Committee, was made by the Committee Chairman, H. L. Donaldson of Pittsburgh to Reginald H. Feild, senior engineer, United Gas Pipeline Company, Shreveport, La. The award consists of $50.00 and a certificate.

The paper at the afternoon sessions on "Methods of Valuation for Rate-Making Purposes—Natural Gas Production System Property," was presented by Ed. C. Connor, Consulting Engineer of Dallas, Texas. Mr. Conner divided his paper into two parts: (1) Natural gas reserves held for future use, an essential element of natural gas service, and (2) Valuation of production system property for rate making purposes.

"A number of reasons can be advanced in explanation of the more or less nebulous conditions that persists with reference to the question as to what constitutes a rational and equitable method of dealing with one of the most important phases of the entire natural gas industry. Among others the following are suggested as being of primary importance:

"1. The Production System Property of a natural gas utility as well as the operating charges growing out of the existence and use of this type of property have no exact counterparts in any other form of public utility service, either with respect to the property itself, or to its functions.

"2. Frequently there is a substantial difference between natural gas utilities with respect to the proportionate part of the total investment represented by the cost of Production System Property, to the relative importance of the production system property in the rendition of current service and to its relative importance as an assurance of the continuity of adequate service. Also in the case of individual companies the relative importance of the production system properties is a variable factor which is subject to substantial change from time to time.

"3. The production and transportation of natural gas for public use is the newest form of major public utility service and perhaps for this reason there has been a widespread failure on the part of both regulatory Commissions and the courts to fully understand and give effect to the fact that the basic physical and economic factors which control the initiation and successful operation of a natural gas production and transportation system are fundamentally different from those which control the initiation and successful operation of any other utility enterprise. This circumstance alone has developed a tendency on the part of the representatives of public authority to adopt methods which while suitable for the proper regulation of other types of utilities, fail to produce equitable results when applied to the regulation of natural gas utilities.

"As the matter now stands the Supreme Court has left the implication that gas reserves, or reserve acreage not presently in use are assets held in idleness and are therefore not a proper part of the utility rate base unless it can be shown that the requirements of the immediate future will necessitate their utilization. It is incumbent upon us, therefore, to develop clear and convincing reasons why the Production System Property of a natural gas utility, consisting in part of undeveloped and non-producing lease-holds, is not property held in idleness in the sense that the generating capacity of an electric utility which is largely in excess of current and future requirements might be properly construed as property held

in idleness but is in fact an essential element of an integrated service unit.

"It must be conceded that the Production System Property of a natural gas utility performs four essential functions:

"1. It provides the source (gas reserves) and the media (gas wells) from and by which gas may be currently produced.

"2. It provides in part the peak load availability required for adequate service during periods of maximum demand.

"3. It provides the basis for the assurance of continuous service over a reasonable period of time.

"4. It fixes the extent of the useful service life in situ of the capital investment in pipe lines, compressor stations and other physical equipment required for transportation.

"It is hardly necessary to call attention to the fact that the elimination from the rate base of a natural gas utility any material portion of the investment represented by property purchased in good faith and as the result of the application of an informed judgment for the sole purpose of assuring a reasonable life expectancy for the entire enterprise would be tantamount to depriving the management of the exercise of its independent judgment with respect to the most important phase of the utility's entire operations—a phase of its operations which affects the interest of the public that it serves to the same extent that it affects the interest of its stockholders.

"It should likewise be unnecessary to call attention to the fact that the general adoption of the method approved by the court of Civil Appeals in State of Texas v. Lone Star Gas Co. (129 S.W. 2nd 1164) would require the management of properties operating under similar conditions either to transfer its responsibility for the continuity and adequacy of its service (represented by the provision of the reserve supply of gas necessary for its future requirements) to casual producers of gas who have assumed no public service obligations or else forego any return or reserve credits on the value or cost of Production System Property and also suffer an out-of-pocket operating loss.

"In concluding this phase of the discussion it should be emphasized that the problems that arise in connection with the maintenance of an adequate supply of gas for a large natural gas utility can only be solved by the prompt application of the informed judgment of its management. These problems cannot be solved by remote control, nor by the application of any general rules, regulations or formulae which may be promulgated by any Board or Commission. It is conceivable that such a policy might be applied to the operations of some other type of utility service without vitally affecting the quality of its service. This statement cannot apply to the natural gas business."

In the second part of his paper Mr. Connor discussed two methods of valuation of leaseholds: (1) Present worth of the sum of the probable future net operating returns method, and (2) market value.

"If as the result of this analysis the conclusion is reached that the present worth of the sum of the probable future net operating revenues method of estimating present value is basically unsound when applied to the property of any public utility and that the use of market value as a criterion of the value of the leaseholds of a natural gas utility is attended by so many difficulties and uncertainties as to eliminate it as a practical yard-stick, the question naturally arises as to what treatment should be given to the Production System Property of a natural gas utility in order to establish its proper position in the rate-base.

"In view of these circumstances it would seem reasonable to assume that the first step to be taken in the treatment of the Production System Property as a part of the rate-base of a natural gas utility would be the elimination of the factors which would contribute either to speculative profit, or to speculative loss. This would be effected by:

"1. Fixing the basic value of the leaseholds properly a part of the rate-base of the utility at original cost represented by the sum of the original consideration and other costs subject to capitalization.

"2. Fixing the basic value of gas well construction and equipment in service at the date of inquiry at reproduction cost new.

"3. Deducting the following items from the gross revenues of the utility before determining the amount available for return and Federal income taxes (a) dry hole expense, (b) the cost of cancelled and surrendered leases, (c) delay rentals if treated as operating expense and (d) the annual amount required for the retirement of the value assigned to the Production System Property if the expenditure for these items represented a reasonable exercise of managerial discretion.

"It is the writer's opinion that the chief problem confronting natural gas utilities with respect to the treatment of their Production System Properties for rate-making purposes is the development of sound reasons for the inclusion of these properties in the rate-base and not in the development of methods for their valuation. It was with this thought in mind that Part I of this discussion was prepared."

CHAIRMEN OF SECTIONS, AMERICAN GAS ASSOCIATION 1940-41

E. N. Keller
Accounting

R. J. Rutherford
Commercial

H. C. Wolf
Industrial Gas

W. E. Derwent
Manufacturers

H. D. Hancock
Natural Gas

D. P. Hartson
Technical

Industrial Sessions Feature National Preparedness and Executives' Panel Discussion

FRANKLIN T. RAINEY
Chairman

EVEN AS WITH RAIN in Southern California — this is "unusual weather" for American industry, and, hence, industrial gas. In war weather, the industrial tree grows rapidly—and oddly—and the industrial gas man faces new problems and new responsibilities. Recognizing this, the Industrial Gas Sessions of the 22nd Annual Convention of the American Gas Association in Atlantic City, October 7 to 10, turned to new subjects and new methods of approach.

Headline features were the "Symposium on National Defense" on Wednesday afternoon, October 9, and the "Panel Discussion of Industrial Gas From the Viewpoint of Executives," on Thursday afternoon, October 10. In addition, an informal round-table on Tuesday afternoon, October 8—at which no pre-arranged subjects were laid on the table, but at which each of over 65 industrial gas men had an opportunity to introduce any problem of the moment and offer it for a thorough going-over by everyone—proved to be a successful experiment for personalizing convention meetings to a degree unattainable in formal scheduled meetings.

Arrangements were made so that the "Symposium on National Defense" immediately followed two addresses: that of Chairman Franklin T. Rainey on "The Gas Industry's Opportunity in National Defense" before the Wednesday morning General Sessions; and that of John H. Van Deventer, President and Editor of *The Iron Age,* on "Executive Policies For Defense Training" before the Industrial Gas Section Sessions at the Hotel Traymore. Thus, two analyses of the subject from different viewpoints serve as a base from which the discussion particularized.

Industry Faces Personnel Problem

Predicting that industry will soon encounter a shortage of trained technical men as a result of both the increased demands of staggering defense business and the absorption of men into the armed services, Mr. Van Deventer posed the problem as "to find a large number of men who have aptitude for training and train them in the shortest possible time." He estimated that the number of new industrial recruits which will be required will be between 5,000,000 and 7,500,000, based upon the number of men needed in industry for each man in uniform and upon estimates of increased industrial capacity requirements.

In order to achieve such rapid training of so many men, Mr. Van Deventer urged industry to "break down" and simplify the operations required in doing any specific job so that such thorough training as is customary on a permanent peacetime basis is not needed—speed being imperative at this point. He further urged more attention to "job analyses" and "aptitude analyses" in order more perfectly to match the worker to the task.

Using toolmakers as an example, Mr. Van Deventer observed that "the supervisory forces and the skilled labor element must come largely from those now employed," and added that such supervisory and highly skilled labor is one of the present day "choke" points of the program. It is his belief that heavy draws can be made upon trade schools and other institutions as well as new employment bureaus; but he cautioned that much "up-grading" of current employees will be very necessary in connection therewith.

In closing, it was observed that "Government is doing what it can to train new recruits for industry, but experience at home as well as abroad indicates that private industry must take the initiative . . . We who believe that production creates wealth ought to welcome the addition to our forces . . . However, we must not forget the post-war period . . . Today the burden rests upon production. Tomorrow the problem will be that of distribution. We can well give this some serious thought as we watch this huge army of new recruits march with American industry."

Six Angles on Our Part in Defense

In order that the Symposium on "What We Mean To National Defense and What National Defense Means To Us" might embrace all viewpoints, six men participated with prepared comments—each representing a distinctly different interest. Henry M. Heyn, Surface Combustion Corporation, Toledo, viewed the matter from the standpoint of equipment, contrasting the industrial gas apparatus of today with that which was utilized in 1918. "Control, mechanization, and specific designs for specific jobs are the most characterizing features of today's equipment," said he, "We dug back in our files for the 1918 designs and found them similar to today's in name only. We are better prepared than ever, not only to meet the challenge of today, but to meet the challenge of tomorrow."

R. S. McBride, Consulting Engineer, Washington, D. C., undertook to interpret the industrial gas sales potential in the various classes of process industries which will be handling the bulk of defense business. These plants he classified as of three types: (1) those which will simply produce more of their usual type of goods, (2) those plants which will be entirely new and built specifically to produce new war products, and (3) those plants which have long

been going concerns but which will undertake to convert their facilities to the production of new types of goods needed in the defense program. Mr. McBride was of the opinion that groups 1 and 3 offered considerable opportunities for the future sale of more industrial gas, but cautioned that the second group will not represent so great an opportunity unless it is possible to run special lines to the new plants and to write off the expenses of gas service within an unusually short period. The greatest opportunity both for service and for profit on the part of the gas industry, he feels, lies in assisting the existing going concerns to adapt facilities to the production of war goods.

As a representative of the natural gas industry, F. B. Jones, General Sales Manager, Equitable Gas Company, Pittsburgh, Pa., suggested "We are already s i l e n t l y contributing much to the defense p r o g r a m." Above all, he urged quick action in reaching decisions related to preparedness business, noting that "official" delays may cost valuable load. From the sales standpoint, Mr. Jones feels that we have much to gain because as an industry, we have an excess of our product to offer whereas others suffer from a scarcity," and our product can be utilized with greatest speed, simplicity, and ease of installation without hard-to-get accessories.

J. P. Leinroth, Public Service Electric & Gas Company, Newark, N. J., portrayed the national defense program as a golden opportunity to demonstrate to industry what gas can do. "We should," he said, "help the customer to select equipment, and make only the most creditable type of installations — to avoid post-war stigmas resulting from hasty engineering."

Crediting the work of the Industrial Gas Section as largely responsible for the degree to which the industrial end of the gas business has increased in importance, recognition and earning power, Frank H. Adams, 1940 President of the A.G.A.E.M., closed the Symposium. He urged an early contacting of procurement offices to avoid mistakes in gas application and to prevent the pyramiding of last-minute rush demands. "After all," said he, "the services we can render in this emergency will be vastly more important to us in the long run than the load involved."

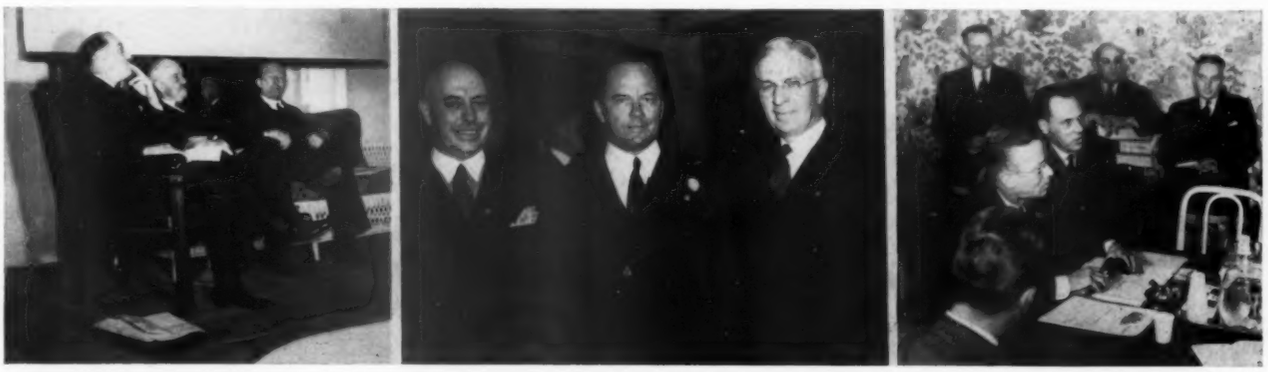
Management Analyzes the Industrial Department

No feature of the Industrial Gas Section meetings held such rapt attention as did the Thursday afternoon Panel Discussion on "Industrial Gas Sales from the Viewpoint of Executives," lead by H. Carl Wolf, President of the Atlanta Gas Light Company and newly - elected chairman of the Industrial and Commercial Gas Section for 1941. Based upon 23 replies to queries made to top executives during the past year by the General Sales Committee of the Industrial Gas Section, the discussion was guided along the lines of industrial gas sales personnel and its compensation, the load factor characteristics of non-residential business, the growing significance of industrial load, executive practices in connection with defense demands, and other management angles. On the platform with Mr. Wolf were: Herman Russell, President, Rochester Gas & Electric Corp., Rochester, N. Y.; R. E. Fisher, Vice - President, Pacific Gas & Electric Co., San Francisco, Calif.; Norman R. McKee, Vice-President, Southern Counties Gas Co., Los Angeles, California; and Charles E. Bennett, President, The Manufacturers Light & Heat Co., Pittsburgh, Pa. Leading questions were addressed to these men periodically and their subsequent comments formed a straight - from - the-shoulder appraisal by the management group of non-residential sales activity.

From the discussion, it was evident that management would appreciate uniform practice in handling demands for increased services and main extensions in connection with war orders. Such agreement was reached on this point that it was recommended that the matter be referred to appropriate Association committees concerned with the national preparedness program.

General accord was also evident with regard to the method of compensation for industrial gas sales personnel—straight salary on a reasonably high scale being favored. After considerable comment regarding the relative importance of sales and technical proficiency in industrial departments, it was apparent that neither can be slighted and that both should be embodied in each man. Of course, it was agreed that straight technical or engineering experts can play a helpful definite part, although they should be kept in the nature of "collaborators" in the actual sales approach.

Many o t h e r subjects were, of course, posed by several of the 160 industrial gas men attending the meeting—and all replies showed, for once and for all, that management is



At the Industrial Sessions: Left, H. Carl Wolf, President, Atlanta Gas Light Company; Herman Russell, President, Rochester Gas & Electric Corp., and R. E. Fisher, V. P., Pacific Gas & Elec. Company.

Center, left to right: Eugene D. Milener, American Gas Association; Walter C. Beckjord, Columbia Gas & Electric Corp.; G. H. Gardner, Columbia Engineering Corp., Columbus, Ohio.

Right, in the back row left to right: Leo Sullivan, Rochester Gas & Electric Corp.; H. E. G. Watson, Consumers Gas Company, Toronto; Clinton B. Cole, Rochester Gas & Electric Corp. Center: Lawrence R. Foote, Central Illinois Electric & Gas Company; C. George Segeler, American Gas Association. In the foreground, (back to camera): Carl Wierum, The Brooklyn Union Gas Company.

more than attentive to the non-residential branches of the business and anxious to foster it in any way possible.

"New Horizons in the Commercial Cooking and Baking Field" were pointed out by Walter S. Anderson, Manager, Industrial Division, Boston Consolidated Gas Co., Boston, Mass., in his prepared address which followed the Executives' Panel Discussion.

Among Mr. Anderson's observations were, "We in the gas industry are a part of the great Food Service Industry because we furnish some of the tools and services with which it plies its trades . . . We have offered gas rates that are competitive with other forms of energy and which, in nearly all cases, provide the incentive of lower costs for larger monthly consumptions . . . Gas is used to prepare most of the more than 5,000,000,000 meals being served this year in nearly 600,000 eating establishments . . . Specialized equipment has taken a front seat, and we offer good gas equipment to meet virtually all today's specialized cooking requirements . . . So far we have kept our expansion of horizons right along with, or even ahead of the horizons of others in the food purveying field, but times are moving fast in this major American industry based upon the growing habit of eating out, and we have got to keep hopping a little faster than the other fellow."

Wolf and Owens New Section Officers

Officers elected for the coming year were: H. Carl Wolf, President of the Atlanta Gas Light Company, as 1941 Chairman of the Industrial and Commercial Section. George F. B. Owens, Assistant Vice-President of The Brooklyn Union Gas Company, was elected Vice-Chairman. Also, in appreciation of the outstanding leadership of Franklin T. Rainey during 1940, Frank H. Trembly, Jr., acting as Chairman of the Advisory Committee of Past Chairmen of the Section, presented Mr. Rainey with a rosewood gavel with engraved silver band.

Project to Carry Natural Fuel From Kansas 800 Miles to Milwaukee, Wis.

Western Natural Gas Co. received permission from the Federal Power Commission on October 11th to construct an 800-mile natural gas pipe line, estimated to cost more than $25,000,000. The pipe line will carry natural gas from the Hugoton field in Kansas to Milwaukee, Wis.

According to the amended application approved by the F. P. C., a new company, Wisconsin Natural Gas Co., has been organized by the applicant under Wisconsin laws, which will construct, own and operate the portion of the proposed pipe line system situated in Wisconsin. All of the stock of the new corporation is owned by Western Natural Gas Co.

Cost Reduced

The cost of the proposed pipeline, according to the applicant's estimate, is approximately $25,208,154, the main line being estimated to cost $17,124,304.

The proposal is based on construction of a twenty-six-inch main line designed to carry gas at gauge pressure of approximately 510 pounds a square inch.

ACCOUNTING SECTION

CHAIRMAN F. B. Flahine opened the first meeting Tuesday afternoon. "Does Your Insurance Insure?" was the subject of a paper by Prentiss B. Reed, Insurance Consultant, New York, in which he called attention to the necessity of clearly defined and understood policies. For example one policy will not pay benefits for fire where the fire was started by explosion, or vice versa.

"Our New Federal Taxes" was the subject discussed by Walter A. Cooper, of Barrow Wade & Guthrie, New York. He pointed out that in some of the effort being made for still bigger taxes the new tax laws are capable of ludicrous manipulation. The vagueness of their original intent carries through to the method and procedure of application. There are constant switches, back and forth from average earnings to invested capital and inconsistencies in the treatment of book and real values.

On Wednesday afternoon informal luncheon discussions were held.

E. M. Alt of Hammond, Ind., presented a paper titled "Customer Accounting," in which he discussed the success or failure of unit or specialized plans of bookkeeping. The "Customer Relations" group discussion was conducted by H. R. Flanegan, Philadelphia, Pa. The subjects discussed were — customer relations today, gaining Mrs. Customer's goodwill, after-the-sale utility obligations, good will factors in billing practice, etc.

F. B. FLAHIVE
Chairman

Harold Quad, Newark, N. J. was Chairman of the panel discussion "Credits and Collections."

W. D. Virtue, Chairman of subcommittee on social security accounting presented a report which is to appear in the December issue.

C. E. Packman, Chicago, Chairman of the group on "General Accounting" talked over plant acquisition adjustments, overhead construction costs and the effects of Federal Old-Age benefits.

O. H. Ritenour, Washington, D. C. was Chairman of the "Property Records" meeting. The discussions included inventory, pricing, identification of small items, active and inactive customers' installations and regulation.

The "Tax Accounting" group, C. R. Luebke, Chicago, Ill., Chairman, discussed new taxes, including excess profit tax, treatment of unpaid property taxes for Federal income tax purposes as well as forms and uses of tax control calendars.

F. H. Deckman, Columbus, O. was Chairman of the "Insurance" group, and the discussion covered forms of fire insurance, as well as insurance against riot, strike, war and casualty. Fire coverage on records, vouchers, etc. was given special consideration.

THE COMMERCIAL SECTION

MEETINGS of this Section, held at the Traymore on the afternoons of October 8th and 9th, brought together large and enthusiastic attendances.

The slogan "For Everyone in Forty-one it's CP" was everywhere apparent—at the meetings, along the boardwalk and by banner in the sky.

Davis M. DeBard, Chairman in his opening address spoke enthusiastically on the evident trend of increased sales figures.

Following the nomination and election of officers for the ensuing year, R. J. Rutherford, Vice-Chairman, who had been elected Chairman for the coming year, outlined the activities of the past year and drew attention to the coordinated programs now available for individual gas companies' use.

"The Trend of the Domestic Load" by George F. B. Owens appears elsewhere in this issue.

T. V. Houser, Vice-President Sears, Roebuck & Co. spoke on Retail Merchandising.

B. T. Franck, Vice-President of Milwaukee Gas Light Co., who is Chairman of the Refrigeration Committee, pointed out the strong influence of the gas refrigerator in protecting and developing the domestic gas load. He directed attention to the effective work of special sales crews devoting their entire time to refrigerator sales.

He presented the trophies to the winners of the 1940 national sales contest whose names appear elsewhere in this issue.

B. H. Wittman, manager domestic sales department of The Peoples Gas Light and Coke Co., Chicago addressed the second session on "The Certified Quality Heating Program" and J. Burr Gibbons, Vice-President of Rogers, Gano & Gibbons, advertising agency of Tulsa took as his subject "Courting the Modern Priscilla" and dealt with public relations problems.

A dramatization — "The Eternal Triangle"—offered by B. A. Seiple, Vice-President in Charge of Sales, Mrs. Eliza M. Stephenson, home service director and John Martin, service manager of Jersey Central Power & Light Co. focussed attention on coordination of departments for the creation and maintenance of satisfactory customer relations.

In the paper by B. L. Johnson, Editor of *American Builder and Building Age* he reported that a survey of 1,000 active builders showed 34% choosing gas for fuel and 56% favoring forced air systems.

W. J. Schmidt, general sales manager, Long Island Lighting Company paid tribute to the CP Water Heater Program, urging that gas companies get behind this program by making full use of every factor for its promotion including suitable rates, trained sales force and market studies along with vigorous advertising.

C. C. Young, assistant new business manager, Gas Service Co. of Kansas City urged complete coordination of effort in promoting the CP in Forty-one campaign. Humorous cartoon slides served to stimulate his address to a great degree.

Trophies for the winners in the eight regional CP Range contests were presented by George L. Schofield, commanding director of the CP Ranger Club and Chairman of the Domestic Range Committee A.G.A.

The final session closed with the initial showing of a sound film in Kodachrome entitled "Fun in the Kitchen," which was produced by Pacific Gas Association in Hollywood, starring Hedda Hopper and Don Wilson. This film is available to gas companies for entertainment of customer and employee groups.

It is the first successful all-synchronized sound picture to be made on 16 mm. Kodachrome in full color and runs for 25 minutes. It tells of food and modern gas equipment,

D. M. De BARD
Chairman

featuring the CP range, and includes a custom made signature appearing with the title. Fuller details as to cost, etc., obtainable from J. S. Spaulding, advertising manager, Southern California Gas Co., Los Angeles.

Hooker Library Offers Service for Chemists

The Hooker Scientific Library, operated as a nonprofit institution by Central College, has inaugurated a new service for chemists who lack convenient access to chemical reference works.

For a nominal fee the library will send the data on any question which can be answered by reference to a chemical manual, dictionary or index such as Beilstein, Mellor, Thorpe, Ullmann, formula indexes and the like. Inquiries taking too much time for the low fixed rate will be answered at a proportionately higher cost, for which estimates can be rendered in advance. Full details will be sent in response to requests addressed to: Hooker Scientific Library, Central College, Fayette, Missouri.

From the Kodachrome sound picture,—"Fun in the Kitchen."

Mantan Moreland, with Don Wilson on the right.

TECHNICAL SECTION

F. M. GOODWIN
Chairman

MEETINGS of the Technical Section were held at the Ambassador Hotel on the afternoons of October 8th and 9th under the chairmanship of F. M. Goodwin, of Boston, Mass.

A resolution was presented expressing the sorrow of the Technical Section over the recent death of Hugh W. Hartman, who had been its secretary for many years. Another resolution expressed hope for the early recovery from his present illness of A. M. Beebee of Rochester Gas & Electric Corporation. Mr. Beebee was originally elected Chairman of the Section, but was forced to resign during the year on account of ill health.

"The Technical Problems of the Gas Industry in Connection with National Defense," was the subject of the first paper, read by P. T. Dashiell, Vice-President of The Philadelphia Gas Works Company. This paper, which is published in full elsewhere in this issue, was followed by an active and extended discussion which in general supported and amplified Mr. Dashiell's views.

Brief reports of the Distribution and Gas Production Committees were presented by their respective Chairmen, C. H. Waring of Kansas City Gas Company and W. K. Beard of The Philadelphia Gas Works Company.

R. M. Conner, Director of the A.G.A. Testing Laboratory then read a paper on the "Design of Atmospheric Gas Burners for Quiet Performance." Mr. Conner pointed out that burner noise may be divided into 6 classes: (1) Noise of flames; (2) flash-back and lighting back; (3) orifice noise; (4) air inspiration and mixing noise; (5) noise of ignition; (6) noise of extinction. He then discussed ways of minimizing or eliminating each of these.

Particular attention was paid to the elimination of noise of extinction and in this connection Mr. Conner pointed out that "for each burner investigated, a definite and reproducible primary air value was found at each given gas rate which presented a limit for the occurrence of noise of extinction. In other words, higher primary air values than the limiting one established conditions which produced noise of extinction, while lower values had the opposite effect. The solution to the problem can, therefore, be achieved by relating this limiting value of primary air to some expression which defines the characteristics of burner design which influence the above-discussed action. Accomplishing this, a burner may be designed so that it permits a primary air injection which is below the limiting value and yet within the range of injection with which the burner is desired to operate. In this manner, any danger of noise of extinction would be eliminated.

"As an outcome of this investigation, the empirical expression given below was developed:

$$\frac{D^2A}{L}\left(\frac{a}{0.0089}\right)^2\left(\frac{T}{560}\right)^{0.33L} = \text{A function of the per cent primary air injection.}$$

in which,
D = average mixer tube diameter, inches,
A = total port area, square inches,
L = length of mixer tube, inches,
a = area of individual ports, square in.,
T = absolute temperature (460+°F.) of mixer tube.

Analysis of this expression in the light of the facts just presented, will disclose that all of the controlling factors on which noise of extinction is dependent are given due consideration."

The subject of the final paper at the first session was "Carbonization of Coal-Oil Mixtures," by C. J. Ramsburg, Vice-President, and G. V. McGurl of Koppers Company. It was read by Mr. Ramsburg, and the principal parts of it are published elsewhere in this issue.

The second session opened with a paper by Louis Shidman, Laboratory Director, Rochester Gas & Electric Corporation on "Determination of the Combustion Characteristics of Fuel Gases." An abstract of this paper will be published in the Decem-

Photos A. Gordon King

Flash-shots during the Technical Sessions. Left to right: C. J. Ramsburg, Vice President, Koppers Company; F. M. Goodwin and D. P. Hartson, retiring and incoming chairmen; Raymond F. Hadley, winner of the Beal Medal.

Left to right:—L. W. Tuttle, Chairman Distribution Committee: E. L. Sweeney, Chairman of Chemical Committee of Technical Section; H. L. Gaidry, Vice-Chairman of Technical Section; R. E. Kruger, Chairman of Gas Conditioning Committee.

ber issue of the JOURNAL.

Brief reports of the Chemical and Gas Conditioning Committees were presented by their Chairman, S. J. Modzikowski, The Peoples Gas Light & Coke Company, and L. J. Willien, Public Utility Service Corporation.

Reginald L. Wakeman, Industrial Fellow of the Mellon Institute of Industrial Research, in a paper entitled, "Plastics and the Gas Industry," told of the great variety of plastic materials which have as a base products or by-products which are or could be produced by the gas or coke oven industries. Mr. Wakeman's exhibit of plastic materials was one of the features of the session.

Studies in "Microbiological Anaerobic Corrosion," was the subject of a paper by Raymond F. Hadley, Electrical Engineer of the Susquehanna Pipeline Company, and winner of the Beal Medal this year. It is planned to reprint this paper in future issues of the JOURNAL.

Dr. Scott Ewing, Research Associate of the National Bureau of Standards, reported briefly on cathodic protection developments in connection with corrosion mitigation.

Home Service Breakfast

A FEATURE EVENT of each annual convention of the A.G.A. has for years been the Home Service Breakfast. In spite of the early hour, (8:00 A.M.), this was attended by upwards of 350 delegates and guests and offered a program of great interest to men and women alike.

Presided over by Mrs. Eliza M. Stephenson of Jersey Central Power & Light Co. of Asbury Park, N. J., the general theme, "Home Service in the American Way of Living," was commented on by President Beckjord, Alexander Forward and Davis M. DeBard.

In her subject, "Training Maids for the Homemaker," Ida Lansden of the Virginia Public Service Company at Alexandria stated that the purpose of special training for maids was to bring them up to date on cooking methods, and to assist the employer, the customer, in getting better meals with a better understanding of fuel consumption.

"To 'Deal in the Dealer' is recognized by utilities as progressive merchandising," was stated by Colleen Fowler of the Kansas City Gas Company. In this company, the dealer cooperative service has developed rapidly during the past two years, with home calls two years ago on gas ranges sold by only one dealer expanded to where at the present time, calls are being made on ranges sold by 48 dealers,—all of the gas appliance dealers in Kansas City.

"Teachers, Teas, Talks" outlined a subject by Betty Stafford of the Bridgeport Gas Light Company in which she pointed out that time and effort spent in cooperating with home economics teachers is well worth while.

Albertine Berry, the incoming chairman of the Home Service Committee and home service director of the Lone Star Gas Company pointed out in her subject, "The Voice of Advertising," that as far as she knew, the home service department in the Lone Star Gas Company was the only one working directly under the supervision of the advertising department, and for that reason, had a double tie-in with sales and advertising.

Orchids for the authors of the Cook Book Revue, and gardenias for the women guests at the Breakfast made the occasion a very colorful affair—being presented with the compliments of the Bryant Heater Company of Cleveland.

A. G. A. E. M. Holds Annual Meeting

W. E. Derwent Elected President of Association

THE Association of Gas Appliance and Equipment Manufacturers held its annual meeting at the Hotel Claridge in Atlantic City, N. J., on October 7 at which time officers and directors for the new fiscal year were elected and sales promotion plans for 1941 were formulated by the Association's various product divisions.

W. E. Derwent, vice-president of the Geo. D. Roper Corp., of Rockford, Ill., was elected president of the Association, succeeding Frank H. Adams, vice-president of the Surface Combustion Corp., of Toledo, Ohio. Mr. Derwent has been active in the gas industry for the past thirty-five years. He is a director of the American Gas Association and a past president of the Mid-West Gas Association. Up until his election as president, Mr. Derwent was chairman of the Association's Domestic Gas Range Division.

W. F. Rockwell, president of the Pittsburgh Equitable Meter Co., Pittsburgh, Pa., was elected vice-president. John A. Fry, president Detroit-Michigan Stove Company continues as treasurer.

Following a meeting of the Gas House Heating and Air Conditioning Equipment Division, it was announced that eleven manufacturers had agreed to finance a national sales promotion program in 1941 for gas fired furnaces somewhat similar in scope to the current "CP" Gas Range activity.

The co-operative budget allowed for the 1941 "CP" gas range selling program amounts to $115,000, which exceeds that of 1940. These funds are in addition to expenditures by the twenty-six gas range companies producing "CP" ranges, and the American Gas Association's half-million dollar appropriation for 1941 gas cookery and "CP" range promotion, it was announced.

The program includes eight separate items, as follows:

1. Gas Industry campaigns; 2. Dealer promotions; 3. Publication of a range merchandising handbook; 4. Consumer and sales training aids; 5. A field planning service; 6. A "CP" Audio-training service; 7. "CP" Range Club activities; 8. Home service contests.

Two major gas industry campaigns will be staged in 1941, a Spring drive (March, April, May and June) and a Fall campaign (September, October, November and December). Spring mailing of promotional pieces will begin in January. This material patterned after that of last year's "Join the Profit Parade" campaign will include broadsides, bill enclosures, newspaper mats, radio spot announcements, window and floor displays, a new cook book, prospect finder plans, ideas for salesmen's contests, procedures for effective dealer cooperation and other similar items of promotional assistance.

The 1941 gas range merchandising handbook will contain sales, demonstration and display ideas and suggestions.

Activities under the heading "Consumer Education and Sales Training Aids" will consist of sound-slide films, and food and health charts.

One sound film, entitled "The Parade to Profits" is designed exclusively for dealer and gas company showings. The other sound-film, "Straight to Your Heart" is for either consumer, gas company or dealer employee showings. It tells a complete story of the "CP" range.

The health and food charts, 43 in number, form the nucleus for a gas cookery story from the health and food savings standpoint.

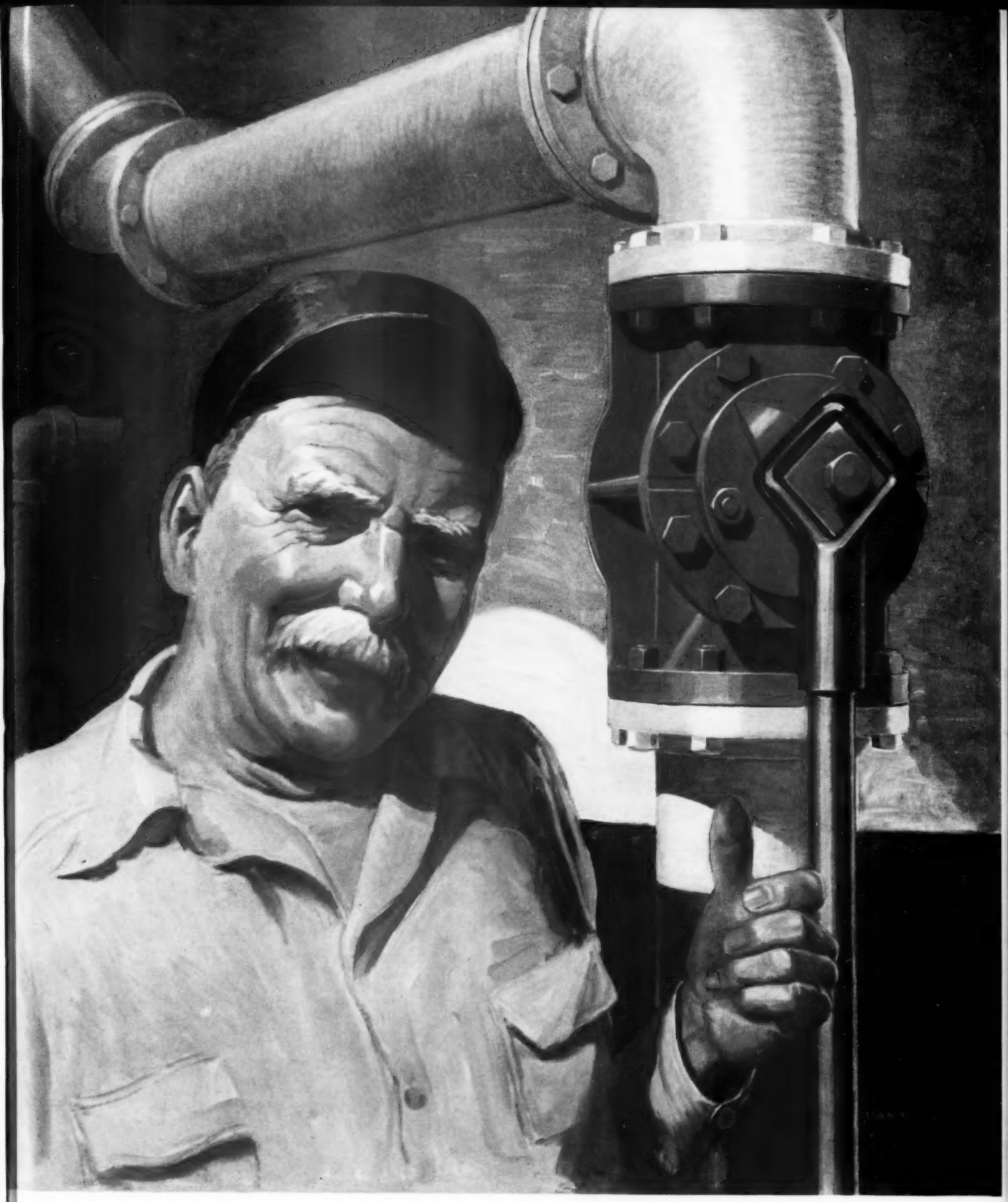
The field planning service will be conducted through the American Gas Association's regional managers, the chairman of the domestic gas range committee, and forty-eight state managers who will assist in setting up local "CP" range promotional activities. The "CP" range manufacturers have made available the services of a field staff to offer assistance in gas company and dealer sales training meetings and field help in setting up campaign plans.

The effective "CP" Audio-Training Service will be conducted on an even larger scale in 1941 than was the case this year.

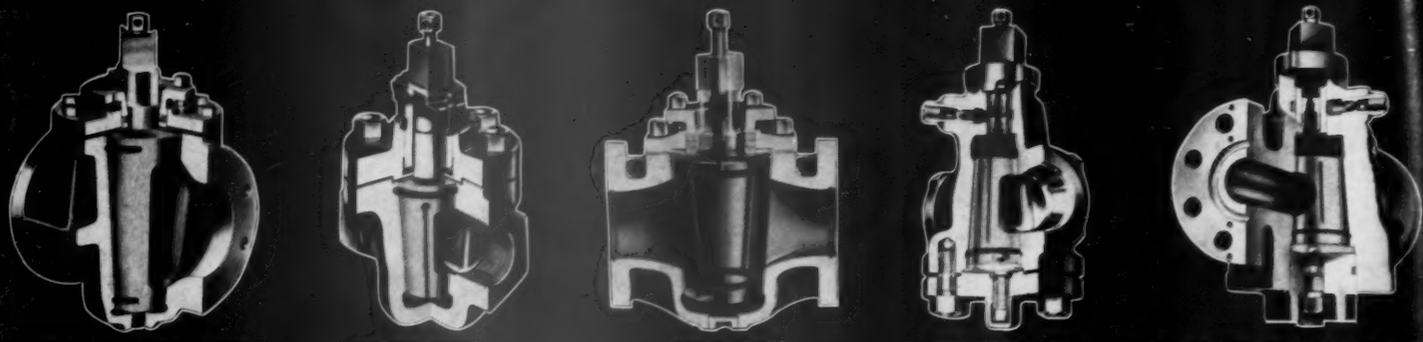
The "CP" range manufacturers have appropriated funds for a $1,500 prize contest which will be open to the home service representatives of utility companies who make the best "streamlined" demonstrations in 1941.

Guest speaker at the main general session was Arthur Hirose, research director of the McCall Corp., of New York, who said that the gas appliance industry has demonstrated a lively vitality during the past four

Photographed between sessions at the annual meeting of A.G.A.E.M.: (left to right)—Frank H. Adams, retiring president of the Association: George S. Jones, Jr., vice-president and general sales manager of Servel, Inc., Evansville, Ind.; W. E. Derwent, vice-president of the Geo. D. Roper Corp. of Rockford, Ill., and newly elected Association president and H. N. Ramsey, president of the Welsbach Company, Gloucester City, N. J.



"Hasn't leaked in 15 years—it's a NORDSTROM*"*



The all-service valves

LOWEST-PRICED—in terms of service!

USE GENUINE NORDSTROM STICK LUBRICANTS

Specially compounded lubricants with plastic properties are available in stick form for Nordstrom Valves. These have been developed by constant research and test. Nordstrom Plastic Lubricants vary in accordance with conditions to which the valve is subjected. For full details ask for Lubricant Manual, Bulletin V-105.

There are two primary factors to consider in the selection of a valve: 1. Its *safety*. 2. Its *cost in service*.

On a gas line, or on a hazardous chemical line, or on a producing oil hook-up, for instance, *safety* must be given first consideration. Will the valve always open or close easily; is it free from corrosion; will it hold the pressure?

If it isn't everlastingly *safe*, a valve isn't economical at any cost, no matter how little its purchase price.

A single valve failure can cause thousands of dollars in material loss; to say nothing of the personal liability hazard. Safety is the factor by which the Nordstrom Valve has won its reputation. Its inherent stability and leak-resistant principle assure 100% safety.

Compare the cost of Nordstrom Valve service. It's the lowest of any valve, without exception. Some operators figure the average cost of ordinary valve upkeep at approximately $5.00 per month. The cost of Nordstrom upkeep is practically nil.

Keep upkeep down with Nordstroms

Nordstrom LUBRICATED VALVES

Sealdport Lubrication

MERCO NORDSTROM VALVE COMPANY—*a Subsidiary of* Pittsburgh Equitable Meter Company

WORLD'S LARGEST MANUFACTURERS OF LUBRICATED PLUG VALVES; GASOLINE, OIL & GREASE METERS

Main Offices: 400 Lexington Ave., Pittsburgh, Penna.

BRANCHES: New York City, Buffalo, Philadelphia, Columbia, Memphis, Chicago, Kansas City, Des Moines, Tulsa, Houston, Los Angeles, Oakland.

CANADIAN Licensees: Peacock Bros., Ltd., Montreal. • *EUROPEAN Licensees:* Audley Engineering Co., Ltd., Newport, Shropshire, England

PRODUCTS: Nordstrom Lubricated Valves; Air, Curb and Meter Cocks • Nordstrom Valve Lubricants • EMCO Gas Meters • EMCO-McGaughy Integrators EMCO Regulators • Pittsburgh Meters for Gasoline, Grease, Oil, Water and other Liquids • Raybould Couplings • Stupakoff Bottom Hole Gauges

Members of the Industrial Gas Equipment Division of the Association of Gas Appliance and Equipment Manufacturers attending the organization's annual meeting included (left to right)—A. M. Stock, vice-president, Partlow Corp., New York; E. D. McLean, president, National Machine Works, Chicago; P. C. Osterman, vice-president, American Gas Furnace Company, Elizabeth, N. J. and F. J. Fieser, Fieser-Lundt Inc., New York.

A Pacific Coast group in earnest confab on the side lines. Left to right:—Clifford Johnstone, Managing Director, Pacific Coast Gas Assn.; W. R. Smith, Continental Water Heater Co., Los Angeles; W. J. Bailey, Jr., Day and Night Mfg. Co., Monrovia; R. G. Logue, Ward Heater Co., Los Angeles and W. G. Cartter, Day and Night Mfg. Co.

years as a result of which it is today a leader among the more "advertising and sales promotion-minded" industries. His remarks were based on a nation-wide survey of the household gas appliance business.

An unnecessary current evil in the marketing of household appliances and one which is a definite detriment common to most manufacturers—not only those in the gas industry—is the existence of far too many "models" of the various products, Mr. Hirose pointed out. He said that by limiting production to fewer basic models of a particular household appliance, manufacturers, dealers and the consumer would benefit greatly, as follows:

Confusion on the part of the consumer would be eliminated
Lower selling costs would result
Decreased overhead would be possible
Smaller investment would be required
Less warehousing space needed
More frequent turnover of stock and investment
Complete display possible with smaller floor space
Decreased service expenses
Less obsolescence
Less shopworn merchandise

He suggested that manufacturers study the question of reducing the number of different basic models now offered to the consumer by the individual manufacturer. He said that the money thereby saved in production, tools and dies could be invested in sales promotion and advertising where it is sorely needed in many cases.

The research authority said the "CP" program "gave the gas industry its first real basis for promotion," remarking that the labelling and certification of merchandise is of real importance in retailing and that the demand from the consumer for identifying marks on merchandise is "growing by leaps and bounds."

Mr. Hirose said a detailed analysis of the American Gas Association's $450,000 annual national advertising program convinced him that it was "one of the most forceful and resultful industry campaigns" that he had ever examined. As a result of this advertising endeavor, he said, the gas industry last year "made greater strides than competitive fuels in winning consumer appreciation of new appliance features." He vigorously suggested that the various appliance manufacturers tie in their respective national and localized advertising closely with that of the American Gas Association, pointing out a need for more extensive promotion of individual brands.

C. W. BERGHORN

Managing Director and Secretary
A.G.A.E.M.

He also emphasized that too many manufacturers have failed to make volume sales because they have confused the difference between having a "large number" of dealers handling their products and working through an efficient organization of "active merchants." He suggested the following rating list by which to judge individual dealers:

Does he know fully the story of your product?

Is he enthusiastic about your brand?

Does he use one in his own home?

Has he passed on his knowledge and his enthusiasm to his employees?

Does he know enough people in his own local market?

Is he seeking to enlarge his acquaintanceship by participating in local civic and social affairs?

Do he and his salesmen go out and do specialty selling?

Does he maintain an attractive display of your product in his window?

Does he maintain a good and complete floor display?

Do your products figure in his local newspaper, billboard or radio advertising?

Does he use give-away circulars on store traffic?

Does he include your literature in his mailings or bills and in packages?

Does he make regular mailings of sales literature to prospects?

Does he follow up sales for additional sales leads?

Does he attend your sales meetings with his salesmen?

Standing beneath the right wing of the Pan-American Clipper Ship is the party of 38 which made the Bermuda flight.

A. G. A. Refrigeration Committee Conducts Bermuda Flight

The first "all-year" refrigerator-selling campaign conducted under the auspices of the A. G. A. Refrigeration Committee, and the Committee's ninth successive annual gas refrigeration drive came to a close at the convention of the American Gas Association in Atlantic City, N. J., on Oct. 8, with the announcement of the winners of the Bermuda flight awards, and the trip by air two days later on a Pan-American clipper ship. The campaign which had as its theme, "Life Begins in '40" was considered more successful than any of its predecessors. It was conducted by the Refrigeration Committee in collaboration with the Association of Gas Appliance and Equipment Manufacturers and Servel, Inc.

Announcement of the companies and salesmen entitled to the Bermuda flights was made by Bernard T. Franck, chairman of the Refrigeration Committee, who is also vice-president of the Milwaukee Gas Light Co. Mr. Franck reported that 484 companies, representing 12,189,000 meters, and more than 3,600

Left:—Aboard the plane, members of the Honor Flight to Bermuda settled down for a comfortable trip. Reading left to right are John W. West, Jr. (Standing), Secretary, Commercial Section, American Gas Association; Walter L. H. Geldert, Jr., and Clyde H. Potter, Southern Counties Gas Co., and J. E. Kern, Southern California Gas Company.

Right:—Prior to the take-off from North Beach Airport, E. L. Coward, Southwest Natural Gas Company, Lockhart, Texas chats informally with Louis Ruthenburg, President of Servel, Inc., Evansville, Indiana.

sales employees had competed for awards during the campaign.

Mr. Franck stated that three major phases of gas refrigerator selling had been emphasized during the campaign, namely, the importance of all-year-round refrigeration; the advantages of specialty selling in the gas refrigeration field; and the opportunity for sales in the replacement market.

Under the terms of the 1940 gas refrigeration campaign, trips to Bermuda were offered to 24 companies that led in sales of Servel Electrolux refrigerators during the period of the campaign and to six gas company sales employees with the highest individual sales records. Each winning company chose an official to make the flight on its behalf, making 30 persons entitled to the Bermuda flight. Accompanying the former were eight other gas industry leaders, including officials of Servel, Inc., the American Gas Association and the Association of Gas Appliance and Equipment Manufacturers.

The Bermuda party, 38 passengers in all, left the North Beach airport, New York City, Thursday afternoon, Oct. 10, arriving in Bermuda in the evening. The return trip to New York was made Sunday, Oct. 13.

Those making the Bermuda flight were: Annual Best Performance Sales Pilots:—L. H. Albus, The Gas Service Co., Pittsburg, Kansas; E. V. Bowyer, Roanoke Gas Co., Roanoke, Va.; E. L. Coward, Southwest Natural Gas Co., Lockhart, Texas; Jack W. Fiedler, Atlantic City Gas Co., Atlantic City, N. J.; Walter L. H. Geldert, Jr., Southern Counties Gas Co., Los Angeles, Calif.; Lewis Hamilton, Georgia Public Utilities Co., Augusta, Ga.; Norton J. Holmstrom, Milwaukee Gas Light Co., Milwaukee, Wisc.; William A. Hudson, Laclede Gas Light Co., St. Louis, Mo.; R. B. Ingle, Macon Gas Co., Macon, Ga.; J. E. Kern, Southern California Gas Co., Los Angeles, Calif.; Arthur F. R. LeFebvre, Public Service Electric & Gas Co., Trenton, N. J.; J. W. McElderry, Georgia Public Utilities Co., Aiken, S. C.; Clifford E. Paige, Brooklyn Union Gas Co., Brooklyn, N. Y.; Clyde H. Potter, Southern Counties Gas Co., Los Angeles, Calif.; Raymond G. Rees, Peoples Gas Light & Coke Co., Chicago, Ill.; N. K. Satterfield, Equitable Gas Co., McKeesport, Pa.; Adolph Seerth, Florida Power & Light Co., Miami, Fla.; T. T. Smith, Macon Gas Co., Macon, Ga.; Ralph Steele, Virginia Gas Distribution Corp., Staunton, Va.; Frank G. Terrill, Atlanta Gas Light Co., Atlanta, Ga.; J. H. Wills, Citizens Gas Fuel Co., Adrian, Mich.; Maurice White, Mobile Gas Service Corp., Mobile, Ala.; J. W. Lee, Atlanta Gas Light Co., Atlanta, Ga.

The Pioneers of Progress Sales Pilots who made the trip were: Ernest E. Audino, Providence Gas Co., Providence, R. I.; Joseph A. Driscoll, Brooklyn Union Gas Co., Brooklyn, N. Y.; William B. Gilmer, Alabama Gas Co., Montgomery, Ala.; Robert W. Smith, Georgia Public Utilities Co., Griffin, Ga.; Albert Timmer, Jr., Michigan Consolidated Gas Co., Muskegon, Mich.

Flight Guests making the trip were: C. W. Berghorn, A. G. A. E. M., New York City; B. O. Brown, Servel, Inc., New York City; R. C. BonSeigneur, Servel, Inc., Evansville, Ind.; R. J. Cannit, Servel, Inc., Evansville, Ind.; W. E. Derwent, A. G. A. E. M., Rockford, Ill.; B. T. Franck, Milwaukee Gas Light Co., Milwaukee, Wis.; Geo. S. Jones, Jr., Servel, Inc., Evansville, Ind.; John W. West, Jr., American Gas Association, New York City; Grant Fink, Servel, Inc., Chicago, Ill., and Louis Ruthenburg, Servel, Inc., Evansville, Ind.

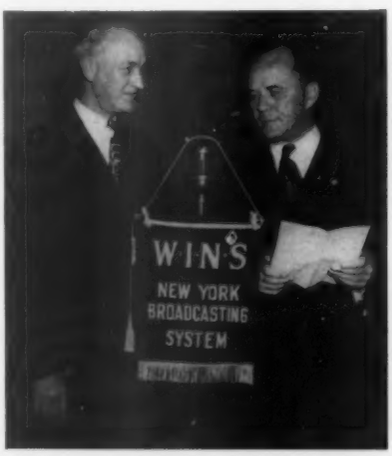
"Gas Industry Day" Celebrated at World's Fair

Delegates Returning From Convention Participate In Colorful Program

Harvey D. Gibson, board chairman of the Fair Corporation, paid tribute during the observance of "Gas Industry Day" to Gas Exhibits, Inc., on Friday, Oct. 11 for its "progressive spirit" in being the first industrial exhibitor to break ground at the New York World's Fair. Speaking during a radio broadcast originating from "Gas Wonderland," the gas industry's exhibit group at the exposition, Mr. Gibson said:

"The same qualities that put the gas industry in the van of exhibit builders at the Fair, have made the industry one of the greatest industrial factors in the economic life of this country."

Climaxing a day of celebration with events staged in various parts of the Fair grounds, the broadcast was attended by leading figures in the gas industry. The program was heard over Station WINS and other stations of the New York Broadcasting System.

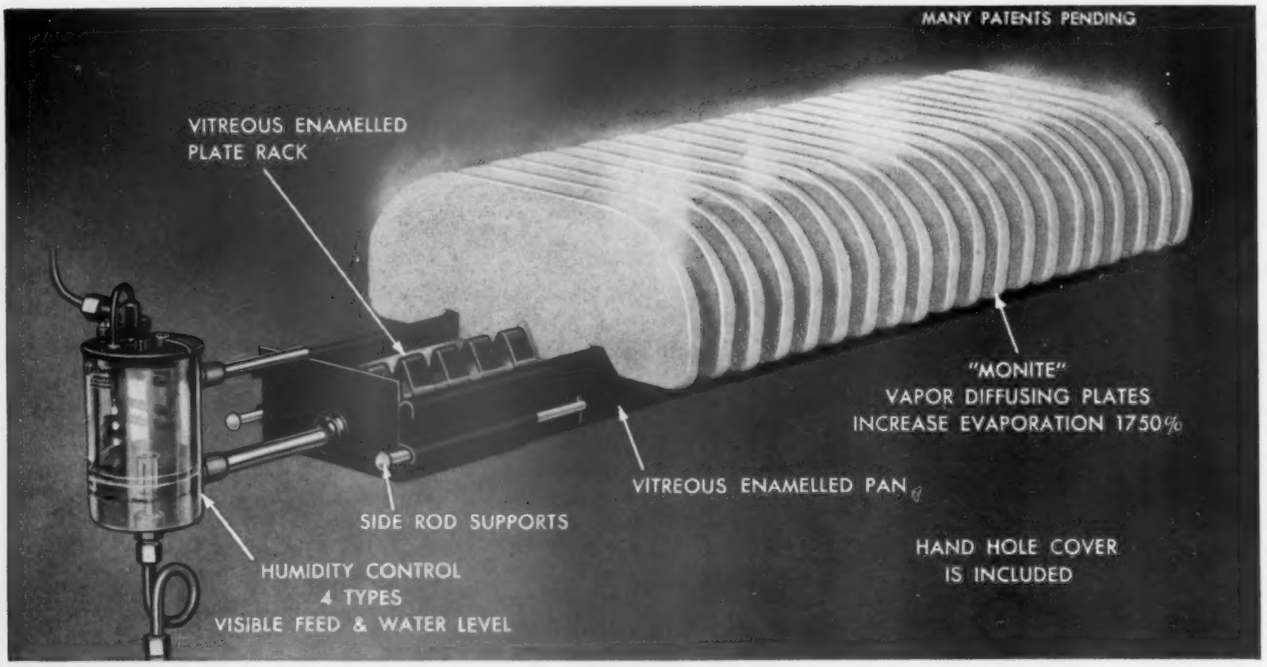


A highlight of the celebration of Gas Industry Day at the Fair was a special broadcast originating in the Court of Flame Theatre of Gas Wonderland, in which Hugh H. Cuthrell (left), president of Gas Exhibits, Inc. and Walter C. Beckjord, president, American Gas Association, were speakers.

Hugh H. Cuthrell, president of Gas Exhibits, Inc. welcomed delegates of the American Gas Association and of the Association of Gas Appliance and Equipment Manufacturers who had come to New York to participate in "Gas Industry Day," following adjournment of their respective conventions in Atlantic City. Mr. Cuthrell recalled the "cold, bleak day in January, 1938" when the Fair grounds were "just acres of filled-in wasteland," and predicted that "the New York World's Fair of 1939-1940 will be referred to in history as one of the great achievements of the age."

Walter C. Beckjord, speaking as president of the American Gas Association, reviewed the growth of the gas industry in recent years and declared that gas is the most widely accepted fuel in the forty-eight states. He stated that the extensive use of gas at the World's Fair made him feel certain that gas would continue to be the basic modern fuel in the future. He also pointed to air-conditioning of homes both in winter and summer as an instance where gas will play an increasing role.

Several hundred gas company executives from all parts of the country participated in the celebration.


MANY PATENTS PENDING
VITREOUS ENAMELLED PLATE RACK
"MONITE" VAPOR DIFFUSING PLATES INCREASE EVAPORATION 1750%
VITREOUS ENAMELLED PAN
SIDE ROD SUPPORTS
HAND HOLE COVER IS INCLUDED
HUMIDITY CONTROL 4 TYPES VISIBLE FEED & WATER LEVEL

EVAPORATING RATE 7½ TONS

OF WATER PER SEASON

THIS is the capacity of the above vapor diffuser in a forced air furnace with full heat on. (Other Monmouth Diffusers range from 2¼ to 50 tons capacity.)

This remarkable capacity is due to improvement in Monmouth vapor diffusing plates—*3 plates now do the work of 4!* Each Monite plate is now equivalent to 70 sq. ins. water surface. This means fewer plates and a shorter pan—lowering prices of Monmouth Diffusers from 8½ to 30%, according to size. *Now Monmouth gives you the greatest evaporating capacity per dollar ever offered!*

★ ★ ★

FREE: Monmouth Humidifier Capacity Indicator Puts Humidification on a Scientific Basis

Humidification is useless unless there is sufficient capacity to do a thorough job. To give customer satisfaction, you must *know* how much water surface, or the equivalent, the humidifier must have for any given installation. The handy, pocket-size Monmouth Indicator gives you the correct answer instantly. Makes you an expert. *Sent FREE to heating men.* Write for yours today; it's a powerful aid in selling adequate humidifiers at better profit.

MONMOUTH PRODUCTS CO.
1939 E. 61st St. Cleveland, Ohio

MONMOUTH

The Greatest Name in Humidification

Ye Gild of Ancient Supplers of Gas Appliances, Skills, Gins, Accessories and Substances, Holds its Fourth Annual Feast

The fourth annual Feast of the Gild of Ancient Supplers of Gas Appliances, Skills, Gins, Accessories and Substances at the Hotel Madison, Monday evening, October 7th, was one of the most enjoyable events of Convention Week. It was attended by nearly 350 members and invited guests who have come to anticipate this function as among the most pleasurable occurring during the national meeting.

The Supplers, who are executives and representatives with at least ten years service to the gas industry in firms that make or distribute appliances, equipment, supplies or services for gas companies, each year invite Burghers (gas utility men and other Non-Supplers) to participate in this annual dinner.

Following enactment of the customary ritual observed at Gild Feasts, tribute was paid the memories of two late Supplers: Edw. R. Guyer and F. G. Curfman, who died in the last year.

With due ceremony the following Supplers were advanced in their degrees. From Villeins (those who have served more than ten years and less than fifteen years) to Apprentices (those who have served more than fifteen years and less than twenty years): A. deMacedo, D. L. Dowling, Harry A. Grassmann, F. M. Pickering, Henry B. Dugger.

From Apprentices to Yeomen (those who have served more than twenty years and less than twenty-five years): Frank H. Adams, M. J. Harper, A. E. Lindquist, E. P. Millikan, C. D. Layford.

From Yeomen to Masters (those who have served more than twenty-five years): Leslie A. Angus, A. E. Robertson, P. C. Rodgers, E. H. Roseberry.

As usual, the highlight of this event, was the Ritual, which this year had for its theme a burlesquing of the building of a gas plant complete by the Supplers, having for its tag line—"We built it and equipped it—now any damn fool but an electric man can run it."

The serious part of the program was contributed by Arthur Dunn, the eminent author and speaker who stressed the part played by salesmen in the education of the buyer and in the distribution of wealth.

Since salesmen are so important and their time costly, Mr. Dunn pointed out that keeping salesmen waiting is an unnecessary increase in the cost of distribution.

The officers who were elected last year for two years are: Mayor, W. S. Guitteau; Senior Warden, C. E. Bartlett; Clerk, J. H. Moore; Keeper-of-the-Treasure, J. A. Mulcare; Aldermen, E. C. Sorby, W. G. Gribbel, J. A. Messenger.

Brooklyn Union Sets All-Time Record in Appliance Sales

Appliance sales of Brooklyn Union Gas Company for the first nine months of 1940 have set an all-time record for this organization.

Sales for that period aggregated $2,744,067.77. The total included $1,590,940.93 in retail domestic sales, $993,332.04 in wholesale domestic, $123,732.24 in commercial, $33,287.23 in industrial, and $2,775.33 in miscellaneous sales. Dealers' sales during the first nine months of this year totaled $547,813.41.

Officers of the Gild who took part in the ritual, left to right: W. Griffin Gribbel, Jos. A. Messenger, and E. Carl Sorby, Aldermen: Jos. A. Mulcare, Keeper of the Treasure; William S. Guitteau, Mayor; C. Edwin Bartlett, Senior Warden; Arthur Dunn, Guest Speaker; J. H. Fagan, Acting Sergeant at Arms holding his bludgeon of office; John J. Bonner, Warden; Duncan Worrell, Acting Clerk.

Photo Central Studios, Atlantic City

To Get the PIPE in the Ground . . .

Use "CLEVELANDS" and *Watch Your Costs go Down!*

MODEL 95—The Famous "Baby Digger" pioneered and perfected by "Cleveland" known and used every day by Gas Companies the country over.

Answers every requirement for distribution work. An unbeatable combination of speed, maneuverability, power and ditch-capacity, in a small mobile unit. Digs 11" to 23" in width. 5½' in depth.

MODEL 80—for Laying Pipe—Filling and Compacting Trenches. The "80" applies machine-savings to the pipelaying and back-filling operations. Speeds up the work, does a 100% job of trench-compacting at much lower costs. Works in limited spaces.

A machine of such genuine utility, you'll wonder how you ever got along without it.

and NOW! **MODEL 75**

A STILL SMALLER TRENCHER FOR SERVICE AND SMALL DIAMETER PIPE . . . The latest "Cleveland" achievement, the "75" weighs but 7000 pounds! Is only 45 inches wide! Digs 8 to 12 inches width, 3½ feet depth.

At last! A tiny trencher, for small trench, that has the required strength and durability.

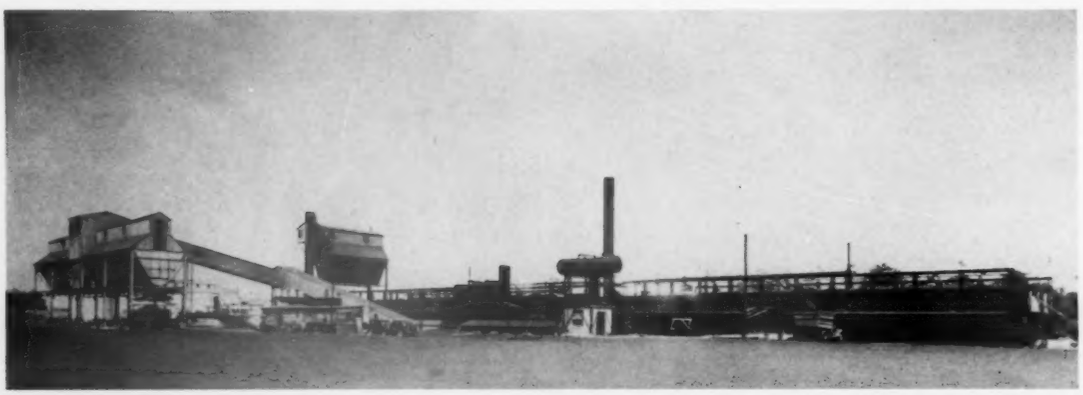
Ask for Information TODAY on These Modern Machines

THE CLEVELAND TRENCHER COMPANY

"Pioneer of the Small Trencher"

20100 St. Clair Ave. Cleveland, Ohio

CURRAN-KNOWLES GAS AND COKE OVENS



Curran-Knowles plants are producing strong reactive coke from straight Low Volatile—High Volatile—High Moisture High Volatile coals ***without blending.***

REACTIVE COKE

Is better for domestic and many metallurgical uses.

COAL CARBONIZING COMPANY

Bank of Commerce Bldg. St. Louis, Mo.

Technical Problems of the Gas Industry in Connection with National Defense—with Special Reference to Toluol Recovery by Gas Works

By P. T. Dashiell

Vice-President
The Philadelphia Gas Works Co.,
Philadelphia, Pa.

Mr. Dashiell delivering his paper before the Technical Section

THE ENTRY of the United States into a war would bring many problems to our industry, the solution of which will be the duty of its technical men.

In such case, the first and most important assignment will be the preservation of adequate gas service both to communities and industries now being served and to additional industrial operations which must spring up as part of the general National Defense Plan.

To my mind there is no more important objective for our industry than to preserve the service and, by foresight and planning, to be prepared to furnish additional gas when and where it is needed.

We had experience in the first World War of how great this additional demand may be and how suddenly it may occur. Many of us have not forgotten that experience.

Part of that preparedness is protection of the manufacturing plants and distribution systems from sabotage and wilful damage by persons who may be inclined for one reason or another to attempt to cripple certain industries by striking at their fuel supply or to bring general confusion by destroying a public service which is vital to normal living.

There was little of this in our industry in the past war. One good reason perhaps was because of the careful precautions taken against it. We should be no less prepared in this respect now and we have some experience to help us.

Presented before the Technical Section, American Gas Association, Annual Convention, Atlantic City, N. J., October 8th, 1940.

There is, however, a new danger in connection with modern warfare with which we have had no experience in this country. Danger from air attack is one which we know little about first-hand. Protection from such involves a new technique which we may have to develop, profiting as far as we can by the experience of others in countries which have had, or are having the experience. In addition to anything we can get from this source, there must be a large amount of original thinking for ourselves.

No two situations, even in the same country are alike, and the best methods of procedure in each situation must be developed specifically for that one. My opinion of the best way to do that is as follows:

We have a Committee of the American Gas Association for National Defense made up of prominent and able men. There should be small subcommittees of the main committee charged with the study of best methods of protecting against malicious attack from within, destruction from the air of vital portions of the plant, protection of operating personnel, etc.

To my mind it would be the height of folly to discuss in gatherings such as this, or in the technical publications, the best method of protecting this or that, for in such discussions or papers, the most important and perhaps most vulnerable part of the plant or distribution system are bound to be publicized and malicious persons, by reading the record of discussion or technical articles, will be informed as to when and how to strike.

The results of study by the subcommittees should be conveyed to a responsible officer of every gas company in the country confidentially, and the conditions of his company made a subject of specialized study. The full cooperation of the management of each company must be had.

The measures for protection should be taken with as much secrecy as possible. Even the fact that protective measures are being taken at all should receive a minimum of publicity.

I would like to emphasize again that I believe the details of all such procedure should be kept out of discussions at association meetings and there should be no descriptive articles in the technical press.

Consideration must be given to the fact that under war conditions, the raw materials of gas manufacture, generator fuel, oil and coal available to us, may change considerably in quality from present day conditions.

Study should be made as to how gas of required quality and quantity could be produced with raw materials of poorer quality or even of different character from those now in use. For instance:

At the last Production Conference, A. E. Pew of the Sun Oil gave us some very valuable information as to the availability of oil for manufac-

ture of water gas [a]. Among other things he said that the more viscous and heavier refinery residues were of least value to the oil refineries and, therefore, could probably be had at lower price, if our industry could use them.

Bunker oils are, in many cases, made by cutting back these heavy residues with cracked gas oil or cracking plant tar, to Bunker C viscosity. Ships must have bunker oil and require oil of Bunker C viscosity. The Navy particularly will insist that its oil must meet the specification of viscosity "Not over 300 Sec. at 122° F.—Saybolt Furol."

A heavy demand for bunker oil for the Navy may mean to us that a large portion of the materials now used by refineries in making oil for our use, of the viscosity which we desire will not be available and we will, therefore, be compelled to use these heavy refinery residues with a minimum of fluxing. Fortunately many of these residues have a higher enriching value in carburetting water gas than the fluxing agents generally used. Their use in a water gas plant becomes simply a mechanical problem involving larger and better insulated tanks and pipe lines, better heating equipment in tanks and for secondary heating of the oil before it reaches the oil spray.

Gas oil under war conditions will certainly be scarcer than at present, and, therefore, more plants will be driven to using oil of fuel oil type.

Some study has already been made to find out what operating methods and changes in equipment are necessary to the successful use of these highly viscous oils for carburetting water gas. The results of such, as far as is known to the writer, are favorable.

Again in case of scarcity of coke, it may be necessary to use as generator fuel either anthracite or bituminous coal, with oils of high viscosity.

It has been demonstrated that some types of anthracite can be very successfully used in conjunction with heavy oil for water gas manufacture. Research work is now being carried further on the use of anthracite for generator fuel but there are some serious problems connected with this which have not been solved as far as I know.

The combination of bituminous coal as generator fuel and heavy oil for carburetting is more difficult, and the difficulties involved have not, as far as I know, been entirely solved, but at least we know that a fair percentage of prepared bituminous coal can be used in the generator of a water gas set along with coke when the carburetting is to be done with heavy oil.

Toluol Recovery

Our product — manufactured gas —in almost all cases, carburetted water gas or coal gas, contains chemicals which are of use in the manufacture of explosives, and other materials required by a nation at war.

The work done in the first war, by the technical men of our industry in the production of such materials, is well known, at least to the older men, some of whom are here today.(1)

One of the most important of these materials is toluol, the basis of the explosive trinitrotoluol. For the benefit of some of us who perhaps are not familiar with toluol, or the technique of its recovery, I will say that it exists as one of the hydrocarbon vapors of the aromatic class present in both water gas and coal gas and can be recovered from the gas as one of the constituents of what is commonly called light oil, by one of several methods.

At the last Production Conference, a description of several methods of light oil recovery and of the design and operation of a light oil recovery plant was given in a paper written by M. Tiddy and M. J. Miller of Semet-Solvay Engineering Corporation.(2)[b]. As I do not see how that paper can be improved upon, I will omit here any detailed description of such a plant and recommend the careful study of that paper to any one interested.

At the beginning of the first World War 1914 to 1916, the foreign governments, notably the French and Russian, were desperately short of toluol and would pay almost any price for it. They purchased large quantities in this country, and the by-product coke industry and the gas industry, to some extent, profitted considerably thereby.

When the United States entered the war, the demand for T.N.T. for our own Army and Navy exceeded anything that had ever been known before. At that time, as is the case today, the main and ready source of supply was the by-product coke industry. It had a potential production of about 8,000,000 gallons per year, with additional plants under construction, which upon completion, gave a production of 17,000,000 gallons in 1918.(3). The requirements of the Government were stated in 1917 to be 17,000,000 gallons per year, increasing in 1918 to 27,500,000 gallons. The question was, from what source could the deficit be made up?

In that year, 1917, the general procedure was very similar to that of today. A Joint Committee of the gas and electrical industries was formed. Its services, offered to the United States Government Council of National Defense, were accepted. There was formed a Chemical Committee. A subcommittee of the latter, known as the Subcommittee on Coal Tar By-Products, had in hand the recovery of toluol from gas works. Its report, (4) published and copyrighted by the American Gas Institute, is interesting and instructive. It goes into great detail as to quantity of toluol available, method of recovery and equipment necessary. The fundamental data of that report are as good today as they were in 1917, although the type of equipment available today is superior to that of 1917. The gist of the report is that from gas works then producing toluol the quantity available was 2,957,000 gallons per year with the possibility of increasing that to 9,000,000 gallons by production from other companies.

A careful study (5) of conditions today indicates the following:

Toluol available from by-product coke industry 30,000,000 gallons per year.

From the gas industry certainly not more than in 1918, possibly less than 9,000,000 gallons. A recent investigation made by the Committee on National Defense of the American Gas Association indicates 9,560,000 gallons from 19 companies.

Possible requirements are more than three times that of 1917—somewhere between 40,000,000 and 60,000,000 gallons. Where is the deficit to come from? The only source is the oil refining industry.

Toluol from an oil refinery was unheard of in 1917 but during the latter part of that year and in 1918 research work was done and one or more methods developed for toluol production directly from oil cracking. Since that time, the advancement in the art of oil cracking, and in the use of catalytic processes, has produced in the oil refining industry a tremendous potential for toluol production, but little if any toluol is being produced by it today. It seems, however, to be the only source from which the deficit, above referred to, can be made up.

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[a] *See American Gas Journal, June, 1940, page 37.*

[b] *See American Gas Journal, September, 1940, page 7.*

Do what it will, the gas industry cannot even begin to bridge that gap. If our industry in general goes into the business of toluol recovery, it will be for the purpose of doing its part in National Defense and not from the profit urge. I believe that this is also true of the oil refining industry.

Both the potential sources of toluol—the gas industry relatively small, the oil refining industry very large—larger even in potential than the by-product coke industry is today.

An important point is that neither the gas industry nor the oil refineries are ready to start production. The by-product coke industry is. Some units of the gas industry are in production now, but in most situations heavy construction work must be done requiring from six months to one year from date of starting before any toluol bearing oil can be produced.

The condition in the oil industry is very similar. No units are in production at this date and six months to one year will be required to get them into production.

(Business Week—issue of August 10, 1940—page 39 refers to a plan by the Shell Oil to build at Houston, Texas, a toluol plant having a capacity of 2,000,000 gallons per year and over.)

All things considered, it is my opinion that the gas industry in general will not be called upon to produce any more toluol than can be produced by those few plants which are now scrubbing their gas for light oil, unless the country should become so deeply in need that the potential production of the by-product coke industry and oil refining industry were to be entirely used up, a condition which seems at this time impossible.

It is possible, however, that, because in several situations much of the 1917-1918 equipment is available, and for that reason certain plants not now scrubbing their gas for light oil can be quickly gotten into production, that these may be required to start scrubbing and produce at least a fraction of light oil rich in toluol, to be refined to nitration specifications at some nearby refining plant.

It is apparently true at this date that there are not enough refining plants nor enough nitration plants to refine or to nitrate more than half of the quantity of toluol taken as the ultimate goal of production.

It may be of interest to consider certain features of toluol production by gas companies, operating as public utilities, which are important and which account for the fact that they can probably produce today not more than they could have produced in 1917-1918, and why it is difficult for them to produce at a cost that would show a profit to their operators.

The reason that the industry as a whole has not as great potential production as in 1917 and 1918 is that in so many large situations natural gas has entirely or in part been substituted for coal gas and carburetted water gas. No toluol can be had from natural gas. Much of the coal gas that was made by gas companies in retorts in those years has been replaced by coke oven gas purchased from the by-product coke industry stripped at the oven plant and, therefore, the toluol from that source has been reduced as far as our industry is concerned by transfer to another industry.

The consumption of oil used for carburetting water gas is less today than in 1917-1918 because many of the larger companies were operating on a candle-power standard then, whereas they now operate on calorific value standard and today are selling a gas of lower calorific value than the gas had under the candle-power standard.

Under present day conditions, as well as those of 1917-1918, there are certain additional costs beyond those of merely operating the scrubbing plant and stripping out light oil.

When light oil is scrubbed from gas—its calorific value is lowered by about 135,000 B.t.u. per gallon of light oil removed per M cu. ft. or 135 B.t.u. per cu. ft. of the gas.

To maintain the standard of calorific value required by state or city, these lost B.t.u. must be restored; or to put it another way, the unstripped gas must be made at such a calorific value that it can be partially stripped and still meet the requirements. This means additional cost.

Many water gas plants are now carburetting with heavy oil, of the fuel oil type, and with the present relation of oil price and that of generator fuel coke, it pays to "reform" as much of the oil as possible. Such practice is not favorable to maximum toluol production and tends to increase the benzol content of the light oil.

For maximum toluol production there should be a minimum of "reforming" of the oil vapors. This will result in a decrease in consumption of carburetting oil per M cu. ft. for a gas of a given calorific value, an increase in generator fuel, a decrease in rate of gas production of the plant, a reduction in tar make, and a change in quality of the tar which may be favorable or unfavorable depending upon the use to which the tar is put. (In general, the gravity and viscosity of the tar will be reduced and percentage of distillate will be increased.)

As an example:

Assume that the heavy oil used for carburetting has an enriching value of 100,000 B.t.u. per gallon and costs 3c per gallon, generator fuel

Taking part in the discussion of Mr. Dashiell's paper; Left Horace C. Porter, Consulting Chemical Engineer, Philadelphia; to right—Fred M. Denig, Vice-Pres. Koppers Co., Pittsburgh; A. I. Phillips, Editorial Director, American Gas Journal; R. S. McBride, Consulting Chemist, Washington, D. C.

Photos A. Gordon King

costs $8. per net ton, tar production is 25% of oil used on the set, that the boiler fuel value of the tar is based upon that of the original oil and that due to its greater weight per gallon, its value per gallon as fuel is 1.1 times that of the oil or 3.3c per gallon dry basis—that the calorific value to be maintained is 535 B.t.u. per cu. ft. Under the operating conditions established to produce a gas of 535 B.t.u. calorific value at lower cost per M for oil and fuel, less tar credit, about 30% of the oil will be used on the back-run. Typical results will be:

Oil per M	4.50 gal.	
Generator fuel per M	13 lbs.	
Tar production	1.125 gals. tar per M	
Net cost of fuel and oil, less credit for tar, will be		
4.50 gals. oil @ 3c	=	13.50c
13 lbs. Coke-Gen. Fuel	=	5.20
Gross cost—		18.70
Tar credit, 1.125 gals. tar @ 3.3 =	3.71c	
Less dehydration and recovery cost œ .5c per gal. of tar =	.56c	3.15
Net Cost—		15.55

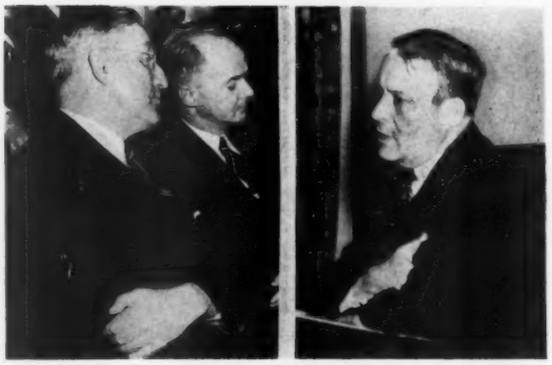
Under the above operating conditions, the percentage of the carburetting oil recoverable as pure toluol will probably not be over 1.5% = .0675 gals. per M cu. ft. This can be increased to over 2% by cutting out the reforming as far as possible, admitting oil to carburetter and generator fire top during the up-run only, with a generous purge of the set before switching to the back-run.

Now assume that it has been decided to scrub from the gas .4 of a gallon of light oil per M cu. ft. or 10% of the carburetting oil used and to maintain the calorific value of the scrubbed gas at 535. The calorific value of the unscrubbed gas will have to be about 562, the generator fuel consumption will be about 21 lbs. per M cu. ft., the oil consumption 4 gals. per M cu. ft., the tar production 1 gallon per M cu. ft.

The cost for fuel and oil less credit for tar will be—		
4 gals. oil @ 3c	=	12. c
21 lbs. fuel @ $8. per ton	=	8.40
		20.40
Credit for tar—1 gal. @ 3.3c	= 3.3c	
Recovery and dehydration	= .5	2.80
Net cost per M cu. ft.—		17.60

This shows an increased cost over that of operation with maximum reforming of 17.60c — 15.55c = 2.05c per M cu. ft.

Under this second set of conditions, when 10% of the carburetting oil, i.e. 0.4 gallons per M cu. ft. is to be scrubbed from the gas, there will be a reduction in calorific value of the gas of about 54 B.t.u. per cubic foot—which must be restored to the extent that the scrubbed gas shall have a calorific value of 535.



These joined in the discussion of Mr. Dashiell's paper; Left to right—Charles A. Lunn, Technical Director and A. R. Belyea, Chemical Engineer, both of Consolidated Edison Company, New York; J. M. Weiss of Weiss & Downs, Consulting Chemists, New York.

Photos A. Gordon King

Now, assume further that the light oil is to be fractionated so as to produce a first cut containing the forerunnings and as much of the benzol as possible, a second cut containing a small amount of benzol and as much toluol as possible—a residue left in the still containing a minimum of toluol and most of the material of the original light oil boiling above toluol.

A fair estimate of the volume relation of each of these fractions to the light oil would be:

Benzol and forerunnings	— 50%
Toluol fraction	— 25%
Residue	— 25%

The benzol fraction may be returned to the gas, and if so returned will restore .4 gal. light oil x 50% x 135,000 B.t.u. = 27 B.t.u. per foot to the gas. The toluol fraction will be sent to the refining plant.

The residue should, under present day conditions, not be returned to the gas, because it will contain a large percentage of gum-formers.

The return of the benzol fraction to the gas will restore 27 of the 54 B.t.u. per foot lost by scrubbing, and the scrubbed gas will have a calorific value per cu. ft. of 535. The cost of producing 1 M cu. ft. of 535 B.t.u. gas has increased by 2.05c as shown above, for causes entirely independent of the cost of operating the scrubbing plant, stripping and fractionating stills.

There may be, of course, an offset to this additional cost, the magnitude of which is very difficult to estimate. That offset may come from the disposition of the benzol and of that fraction of the light oil boiling above toluol. Under favorable market conditions this may be great.

It is not to be taken for granted, however, that because benzol is recovered from the gas, it is going to be immediately salable. The main outlet for it might be motor benzol, and a smaller, but still a very important outlet, would be to the chemical industry for dyes and synthetic phenol. At this time these markets seem to be quite dull. The marketing of benzol incidental to toluol recovery is too complicated a matter to be discussed in this paper. I therefore believe that it would be wise to consider that the benzol, produced incidentally to emergency toluol production by gas companies, is going to be returned to the gas to partially make up for B.t.u. lost by scrubbing out the light oil. In this case, with heavy oil at, say, 3c per gallon, the benzol will not be worth more than 3c per gallon.

There will also be an advantage gained by the removal of the high boiling hydrocarbons from the gas, in that they contain a large percentage of gumformers; their removal should reduce the total cost of servicing customers' appliances through a reduction in the number of pilot outages. The value of this phase of the situation is exceedingly hard to express in cents per M, but it will probably not amount to more than .1c per M cu. ft.

The residue of the light oil boiling above toluol, containing xylene, resin-formers, styrene and indene, and some naphthalene, has also a commercial value.

In most gas works there is no equipment for fractionating this material or obtaining the more valuable ingredients in any great degree of purity, and therefore it is probable that this residue will have to be disposed of in the crude state as it is produced.

Suppose that this could be sold at a price which would net 9c per gallon. In volume it has been assumed as .10 gal. per M cu. ft. (25% of .4 gal. light oil).

The credit to the cost of toluol production would be .9c and from

above an additional .1c per M cu. ft. for reduction in customers' service expense, or 1.00c total. Add to this the credit for benzol and forerunnings .20 gal. per M at 3c = .60c, making the total credit to the cost of toluol production for products of Light Oil recovery other than toluol 1.60c.

Applying this credit against the increased operating cost of gas production incidental to toluol recovery, there is still an excess cost of 2.05 — 1.60 = .45c per M cu. ft. On the other hand, if there is not an active market for the high boiling residue, it may have to be sold or used at its fuel oil value of not over 2.8c when heavy fuel oil costs 3c.

The above would indicate that unless conditions are unusually favorable, the credit from the disposal of the benzol and the high boiling residue will not offset the additional cost to a water gas works of changes of operation tending to production of maximum toluol.

There is still another method of disposing of at least a portion of the higher boiling fraction. If conditions warrant, a naphtha fraction may be taken from it and recracked by running it on the carburetor of a water gas set. By this means, it may yield as much as 20% of itself as toluol. Its value for this purpose will depend upon the value of the toluol recovered and sold.

No attempt will be made in this paper to show what sale price for toluol is necessary to make toluol recovery profitable. Its main purpose is to point out that in a normal gas works, if light oil recovery is to be practiced with toluol production as the main objective, that certain problems of operation will be encountered, which are:

(1) Preservation of the required calorific value of the gas after scrubbing.

(2) Securing additional material, carburetting oil or something else to restore the loss in calorific value.

(3) Changes in operating method.

(4) Disposition of the products of light oil recovery other than toluol.

These can all be solved, but the solution involves additional cost.

Therefore, my opinion is that in few instances, and only under especially favorable conditions, should gas companies go into toluol recovery.

On the other hand, the gas companies have the ability to produce toluol, and if such toluol is needed by our Government as part of its National Defense Plan, it is the duty of the managements of those companies to recover it with as much economy as possible—but that agency of the Government whose business it is to produce toluol for National Defense should pay the additional costs of operation, as well as those of plant construction.

For Details—See Appendix I and II.

APPENDIX I

The data given shows the rate of recovery of light oil—benzol, toluol and naphtha fractions—which may be obtained when operating a water gas set under two different sets of operating conditions:

A—To produce gas of 530-535 B.t.u. calorific value at lowest cost per M cu. ft.

B—Minimum "reforming" to produce maximum toluol.

The water gas set from whose operation these results were produced is an 11 ft. 3-shell set equipped with waste heat boiler and back run, having its own individual condenser, relief holder, and meter, and its own oil meter and oil supply tank.

The oil used to carburet is heavy oil of the fuel oil type of the following general description:

Specific Gravity, °A.P.I.	—12 to 17
Flash, closed cup	—150° F. min.
Viscosity, Saybolt Furol, 122° F., sec.	—1550 max.
Conradson Carbon	—13% max.
Ash	2.5% max.
Enriching value determined by Laboratory	—100,000 to 110,000 B.t.u. per gal.
The generator fuel—Gas Retort Coke (hot) and By-Product Coke having an ash content	—7% to 9%

	Operating Conditions (*A*)	(*B*)
Cycle, minutes	4.6	4.6
Generator air per minute, cu.ft.	11,000	10,000
Steam per minute, lbs.	245	226
Blow, % of cycle	32.9	28.7
Run, % of cycle	58.5	64.8
Oil on back-run, % of total oil	29	2
Oil in carburetter, % of total oil	58.5	50.7
Oil in generator, % of total oil	41.5	49.3
Make per set per 24 hours, cu.ft.	4,552	3,470
Calorific value of gas, B.t.u.	534	564
Oil used per M cu.ft., gals.	4.41	4.11
Generator Fuel per M cu.ft., lbs.	13.26	19.79

Light Oil Scrubbing

This was done on a continuous sample of gas passed through a train of containers partially filled with straw oil. Complete scrubbing of the gas sample was accomplished. The gas passed through the scrubbing train was measured by meter.

The average results of large number of tests are:

Gas Passed Through	*Operating Conditions* (*A*) *111 Cu.Ft.* Per M Cu.Ft.	Yield from Carb. Oil % Volume	% of the Light Oil	(*B*) *92 Cu.Ft.* Per M Cu.Ft.	Yield from Carb. Oil % Volume	% of the Light Oil
Light Oil Recovered (Distillate to 200° C.)	.3308	7.43	100.0	.3170	7.79	100.0
Forerunnings	.0106	0.24	3.2	.0115	0.28	3.7
2° Benzol	.1680	3.77	50.9	.1263	3.10	39.9
2° Toluol	.0649	1.46	19.6	.0813	2.00	25.8
Naphtha, i.e. oil whose boiling point is above that of toluol	.0320	0.72	9.5	.0387	0.95	12.0
Washing Loss, Straight Run Residue, Distillation Loss	.0553	1.24	16.8	.0592	1.46	18.6

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Description of Scrubbing Train of Apparatus and Laboratory Method of Valuation of Light Oil

APPENDIX II

Gas Scrubbing with Straw Oil

The gas is scrubbed by means of oil in a train consisting of 12 half-gallon bottles followed by a meter equipped with a thermometer. The first and last bottles are blank while

each of the other 10, contains one liter of straw oil (Absorbent oil No. 1, supplied by Atlantic Refining Company). The gas is drawn from the center of the main at the rate of 4 to 5 cubic feet per hour so as to pass about 100 cubic feet in 24 hours. The bottles are placed as near the main as possible, and inlet wrapped if necessary, so nothing will drop out of the gas before entering the bottles. The bottle connections consist of copper tubing having 5 small openings in the ends dipping into the straw oil to break up the gas stream for increase in scrubbing efficiency. All connections are metal to metal with a minimum of rubber tubing exposed to gas.

Steam Distillation

The first nine bottles of straw oil are combined in a metal container and live steam passed through the oil until a small amount of steamed distillate, say 10cc., shows a start point over 220° C. on straight distillation. The distillate is cooled with a condenser and collected in a liter separatory funnel. The condensed water and oil are frequently drained from the separatory funnel, and the oil transferred to a bottle.

The tenth can be steamed separately to make sure all the light oil is contained in the first nine bottles. The distillate from this can usually boils over 220° C. indicating negligible quantities of light oil from the gas. It takes about 10 hours steaming to remove all the light oil from the straw oil.

Crude Separation

The recovered distillate is now distilled through a fractionating column which consists of a 1″ Hempel tube about 15 inches long containing eight inches of glass beads having a diameter of 3 to 5 mm. Cuts are made on oil to 75° C., 75° to 160° C. and 160° to 200° C. The rate of distillation is about 2cc. a minute. The fraction to 75° C. consists of forerunnings, the cut 160° to 200° C. is considered as crude heavy naphtha. The cut from 75° to 160° C. contains benzol, toluol, xylols, etc. All quantities are carefully measured.

Washing with Acid and Soda

The fraction 75° to 160° C. is transferred to a glass separatory funnel and 6% of 93 to 95% sulphuric acid (three lots of 2% each) added slowly to the oil with constant shaking. The acid is added so that the oil does not heat over 30° C.

If the oil gets too hot, the funnel is cooled with water. The oil and acid are shaken for several minutes until the sides of the funnel are free of thick acid sludge. The acid and oil mixture is then allowed to settle for about one hour. Ten cc. of warm water are slowly poured down the side of the funnel. The acid sludge and water form at the bottom of the oil layer in the funnel and are drawn off slowly.

Ten per cent by volume of a 10% solution of sodium hydroxide is added, the funnel cooled and gently agitated and finally shaken for several minutes. The oil turns either a grayish white or an orange yellow color. The mixture is allowed to settle for at least an hour and then the soda layer is drawn off. The oil taken for the acid and soda wash, less the volume of washed oil equals the wash loss. In some cases, the figure for the wash loss is final as found at this point because the oil is dry; in other cases, an addition must be made to the first wash loss if water is found in the straight run distillation described next.

If an emulsion is formed which will not settle out or separate, after the soda solution is added, the whole mass is distilled and the corrections for wash loss are made at the end, that is, after all the dry distillate is collected.

Straight Run Distillation

The oil after the acid and soda wash is distilled straight with fire until SO_2 fumes appear in the flask. This usually occurs with the thermometer showing 180° to 200° C. The receiving cylinder contains the distilled oil and water. The water is measured and added to the first wash loss while the oil distillate is carefully measured and placed in a glass flask for the next operation.

Refined Column Distillation

The glass flask containing the washed distillate is connected to a ½″ glass column about 30″ long. The lower part of the column contains 9″ of 3 to 4 mm. glass beads while the upper section contains a glass rod, 9″ long, equally centered in the tube which acts as a planer. At the top a side take-off tube leads to a glass water jacketed condenser. The oil is distilled through the column at a rate not over 2cc. a minute, cutting at 75° C., 110° C. and 138° C. In case the oil under examination is mostly benzol and toluol, a known amount of 5 degree boiling xylol is added before dephlegmation. The added xylol is deducted in making the final calculations. The thermometer used for this distillation is graduated in fifths of a degree centigrade. The fractions are straight run afterwards, noting the start point, 25%, 50%, 75% and dry point. There is seldom any distillate boiling below 75° C. in the refined dephlegmation and the cut 75° to 110° C. usually starts at about 81° C. and goes dry at 105° to 107° C. The cut 110° to 138° C. starts about 111° C. and dries between 125° and 130° C. The residue starts at about 140° C. and dries between 180° and 200° C.

The comparison of the results of the distillation of the 75° to 110° C. cut and the 110° to 138° C. cut with distillation curves of known mixtures (Benzol—Toluol and Toluol-Xylol — Distillations) gives the direct percentage of C. P. Toluol in the fractions. The difference between 100% and the per cent of Toluol equals either Benzol or Xylol, depending on which fraction is compared.

Both fractions and the residue are sulphonated in accordance with the following method:

Ten cc. of the fraction are placed in a Babcock milk bottle and three

(Concluded on page 76)

EXAMPLE

Crude Separation

To 75° C. cc.	4.5	
75° to 160° C. cc.	118.0 (a)	138 cc.
160° to 200° C. cc.	15.5	
Residue cc.	72.0	
Loss	Trace	
Total	210.0	

Washing

118 cc. oil before washing	
104 cc. oil after washing (b)	
14 cc. washing loss	

Straight Run

104 cc. straight run	
92 cc. oil recovered (c)	
0 cc. water	
12 cc. straight run residue	

Ref. Column Dephlegmation

To 75° C. cc.	Nil
75° to 110° C. cc.	64.0 (d)
110° to 138° C. cc.	23.5 (e)
Residue cc.	4.5
Loss	Trace
Total	92.0

Straight Run Distillations of Cuts From Refined Column Dephlegmation

	75° to 110° C.	110°–138° C.	Res. above 138° C.
Start–82.0		111.0	142
25%–84.8		113.0	162
50%–86.3		114.8	172
75%–90.5		117.8	180
Dry point 107.0		129.0	195
Benzol	77	—	—
Toluol	23	83	—
Xylol (Ref. Sol. Nap.)	—	17	33
Heavy Naphtha	—	—	67
Total	100	100	100

Corrections are made for vapor tension on all thermometers used on refined oils.

(a) Fraction 75° to 160° C. to be washed and refined for BTX.
(b) Oil after washing to be straight run for elimination of washing residue.
(c) Fraction to be columned for cut containing benzol-toluol and cut containing toluol-xylol.
(d) Cut containing benzol-toluol.
(e) " " toluol-xylol.

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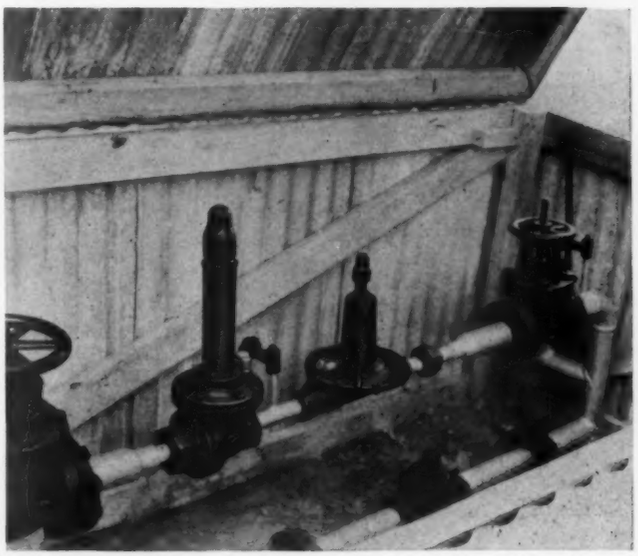

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Liquefaction, Storage, and Regasification of Natural Gas

by

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THE PROBLEM of how to meet peak-load demands in the gas industry has been pertinent to gas executives and engineers for many years. In the manufactured gas industry, when consumption exceeds the capacity of gas making equipment, it usually has been possible to draw reserve supplies from low pressure gas-holders, well located in the distribution system. When demand slackens, the excess of gas produced over that required by consumers can be stored for some time in the aforementioned gas-holders, to be subsequently withdrawn as occasion requires. Such procedure has become standard practice, and indeed serves as an insurance feature to those responsible for continuous service to the public.

Natural gas companies have experienced greater difficulties in solving peak-load demand problems than those utilities distributing manufactured gas. The reason thereof is immediately apparent, when one considers, first, the great distance generally existing between the source of natural gas supply and the consuming center, and second, the fact that the two must be joined by a pipe line system sufficient in size to deliver an adequate supply of fuel for customer use at all times. In the northern states, during the warmer months, the pipe line system operates at only part of its capacity, result being that many wells are shut in at that time and various compressing units are inoperative. The system is not called upon to deliver the amount of natural gas for which it was designed until on the coldest days of the winter when all available wells are turned into the gathering lines and all compressors are in use. If the cold spell is prolonged or extremely severe for three or four days, customer demand may equal or even exceed the capacity of the system to deliver. It is then that some extra gas, available from nearby storage, would indeed prove a boon to the utility.

Adequate storage of natural gas, however, presents a somewhat complicated picture, attended by difficulties which have not been easy of solution. Low pressure natural gas-holders located in proximity to gas consuming centers have never been extensively used, principally on account of the fact that for natural gas, their capacities are limited and their cost prohibitive. This situation exists due to the fact that the natural gas load is extremely variable, caused principally by a high percentage of that load coming from house heating, which is directly dependent on the weather. The manufactured gas industry has been able to correct this variable load curve by the use of large gas-holders, but the natural gas industry has always handled quantities of gas too large to make the same method practicable. Industrial and commercial demands are not greatly affected by extremely low temperatures, but as those demands always exist, irrespective of climatic conditions, same must be satisfied, even at a time when human comfort appears of paramount importance.

Generally speaking, the pipe line has been the gas-holder of the natural gas utility. In former times, natural gas has been stored in the pipe line by the simple expedient of raising pressures therein during the night to the limits allowable, if necessary, so that the gas thus stored could be available on the following day, when demand arose, which if severe, may exceed for several hours the capacity of the entire system, as shown by continuous main line pressure drops. Such pipe line storage as described is indeed helpful to the operating personnel, but it has become increasingly evident to them that such a method is not entirely successful under all conditions, and must be supplemented or augmented by storage more adjacent to the city gates.

At least one gas company has attempted the solution of its storage problem by the installation of high pressure tanks at the edge of the consuming center. Natural gas from the pipe line is pumped into these tanks at off-peak times, to be removed therefrom when needed. As with the low pressure gas-holders, we believe the cost of high pressure storage to be excessive, if large volumes of natural gas are involved.

Other natural gas companies have very successfully stored natural gas underground, making use of depleted gas fields, into whose gas sands have been pumped large volumes of natural gas in the summer months when the pipe line system was not being operated to capacity. Obviously, a compressing station is required for such an operation, as field storage pressure soon exceeds pipe line pressure. Also, the necessity of controlling all leases is apparent. At times of peak demand, the natural gas can be withdrawn from the storage pool. Such procedure not only may completely solve the peak-demand problem, but it also contributes to less seasonal pipe line operation, allowing larger volumes of natural gas to be handled in the warmer months. If the natural gas utility is so fortunate as to have its underground storage within a few miles of the consuming center and to have sufficient capacity therein for all emergencies, the situation may be considered well-nigh ideal, and the necessity of capital investment for additional pipe line facilities is obviated. If the storage pool is available on the pipe line at a point three-fourths of the distance to the city, or even one-half, natural gas can be transported from the extreme end of the line in the summer and stored for future use.

It can be seen from the foregoing that adequate natural gas storage adjacent to certain cities has become a problem to the natural gas industry, urgently in need of attention. Some type of storage was needed wherein

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the necessity of high pressures could be removed, the use of large containers rendered unnecessary, and the concentration of the maximum number of cubic feet of natural gas in the minimum space accomplished. We believed that by the liquefaction of natural gas, all of the foregoing requirements could be satisfied. This belief was influenced to a great extent by the activities of the U. S. Bureau of Mines, first at Fort Worth, Texas, and later at Amarillo, Texas, where natural gas was liquefied in the process of helium production. Natural gas liquefaction was an accomplished fact, but we were faced with its storage, whereas the Bureau regasified the liquid immediately following helium extraction. We were intrigued to the greatest extent by the fact that one cubic foot of liquid natural gas at atmospheric pressure will produce approximately 600 cubic feet of free gas at ordinary temperature.

Late in August, 1937, we began an intensive study of natural gas liquefaction, its storage, and subsequent regasification. It was felt by all that the liquefaction of the natural gas itself presented unsurmountable difficulties, as proven by the U. S. Bureau of Mines work already mentioned. The basic problem was to remove heat from the gas down to its boiling point at atmospheric pressure, and to reject it in some fashion to cooling water of approximately 60 degrees. However, the storage of liquefied natural gas, whose boiling point is from —250° to —258° F., dependent upon composition, was the chief difficulty, entailing as it does the use of (1) special metal tanks, which would not shatter at the low temperature mentioned, and (2) some special type of insulation around the tanks which would prevent the too rapid infiltration of heat through the tanks and into the liquid gas, causing such excessive evaporation as to render the entire project not only unfeasible but prohibitive from an economic standpoint. Regasification following storage appeared not too difficult of attainment, although methods of handling the liquid at the low temperature caused some misgivings. It was believed, once the problem of liquefaction, storage, and regasification of natural gas was solved, that it would be relatively simple to adapt the entire operation to the low pressure distribution phase of a natural gas utility. The plan called for the liquefaction of the natural gas at the edge of the city, using gas taken from the pipe line during the months of September, October, and November, when the system was not taxed to its capacity. The liquefied natural gas would be stored in special insulated tanks, to be withdrawn therefrom and regasified when need arose. It was realized that some gas would evaporate daily from the storage tanks, as some heat infiltration would always occur. This gas could either be reliquefied, or if the liquefaction plant was shut down on account of storage being filled, it could be fed directly into the city mains. During the extreme period of low atmospheric temperatures, quite a volume of liquid gas would be removed from the storage tanks. This could be replenished, as experience has taught that there are many mild winter days, when the natural gas pipe line system is not taxed to capacity and gas can be withdrawn therefrom for liquefaction and storage. At the end of the winter season, whatever liquid gas remained in the storage tanks could be allowed to evaporate at will into the distribution system. The plant would then be idle until the following September.

Experiments were made in the laboratory with a small tank, covered with three feet of block insulation, in which thermocouples were installed at six inch intervals for temperature measurement. This tank was filled with liquid nitrogen, and refilled at intervals, over quite a few days, in order to attain a temperature equilibrium. From the amount of nitrogen evaporated and from the thermocouple readings, valuable information was secured as to heat infiltration and as to types and thicknesses of insulation. Also, the behavior of various metals under these low temperatures was studied.

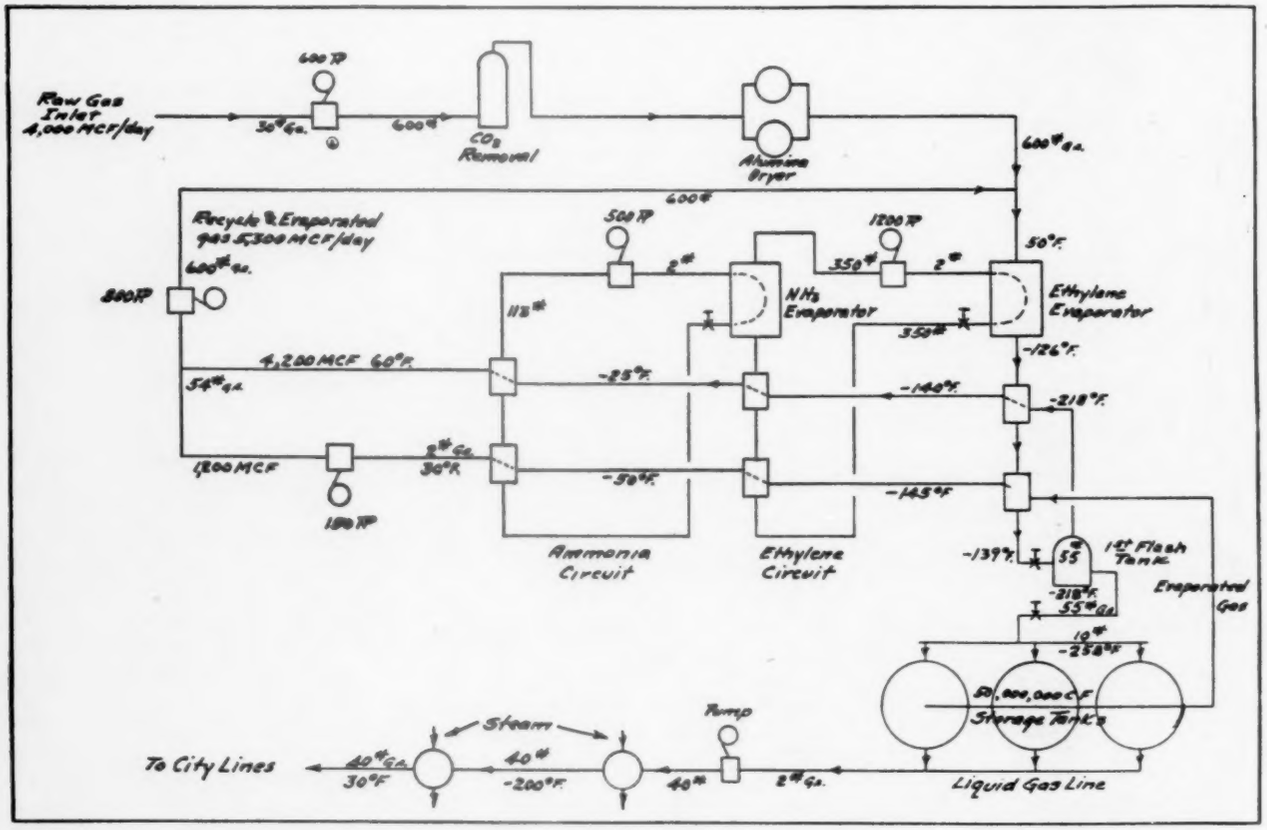
Finally, after considerable laboratory work and research, the choice of design for a liquefaction plant narrowed down to two methods. The first made use of an expansion engine, taking work out of high pressure gas and exhausting this gas at a very low temperature, which could be utilized as a cooling medium for the high pressure gas to be condensed. The second employed the so-called cascade system of removing heat in steps through the medium of three or four circuits, each using a different gas which would liquefy at successively lower temperatures and by exchanging heat between the circuits. Both ideas were workable, but finally the cascade idea was adopted and all work done since has been along that line.

By September of 1939, research work had progressed sufficiently far in the laboratory to warrant the erection of a pilot plant, wherein relatively large quantities of natural gas could be liquefied, stored, and regasified, making use in a practical way of the methods developed on a small scale, and whereby certain preconceived ideas could be tried out for the first time. We were particularly interested (1) in the actual performance at low temperatures of certain alloy steel tanks, (2) in the type of insulation and its thickness, (3) in the evaporation rate of liquid natural gas, (4) in a method of handling whatever nitrogen was present in the gas and which would not be liquefied, (5) in methods of water vapor and carbon dioxide removal, and (6) in regasification. The pilot plant was erected at our Cornwell Station and was designed to condense to a liquid 400 M.C.F. of natural gas per day, using three cascade steps. For the first step, ammonia boiling at —27° F., and isobutane boiling at +11° F. were considered, while ethane with a boiling point of —129° F., and ethylene, boiling point —152° F., were given consideration for the second step. The choice of ethane and isobutane would have been ideal, for all make-up could have been secured by fractionation of the liquefied natural gas. But as their temperatures did not work out so satisfactorily, ammonia and ethylene were finally chosen.

It was realized that early in the temperature drop, water, and carbon dioxide would solidify and completely plug the tubes, so that they had to be removed at the very start of the process. For this, a scrubbing plant using mono-ethanolamine and diethylene-glycol was first introduced, followed by two tanks filled with granulated aluminum oxide to remove the last trace of water vapor.

For storage, we used a horizontal symmetrical tank 10′ in diameter by 18′ long, holding 14,500 gallons equivalent to about 1,000 M.C.F. of gas. This was made of alloy steel plates and was covered with 2 feet of formed cork, cemented on and waterproofed with bituminous tar. At the Cornwell Station, large quantities of 800 to 900 pounds gas, dehydrated to 30° F. were available, and also about 400 horsepower of ammonia refrigeration. For the upper temperatures, conventional pipe and fittings designs for the various pressures were used, but as soon as —50° F. was reached, all pipes, valves, exchangers, etc., were made of either pure copper or stainless steel.

The plant was completed and put into operation the middle of January,



Flow sheet of the liquid gas storage plant being erected at Cleveland, Ohio.

1940. It took about four days running to chill all of the material before we began to get liquid gas, and then a three-day run gave us our first tank—90% full. We then shut the engines down and let this tank stand to get the rate of heat infiltration and we found a daily evaporation of about 28 M.C.F. of free gas. Later, we built several evaporators and finally developed a design so that we could evaporate the liquid as fast as it was condensed, allowing us to run constantly for several weeks at a time and get actual operating conditions and data.

We arrived at the following conclusions from the operation of the pilot plant:

(1) The last possible traces of water and carbon dioxide must be removed, as failure to hold up the amine concentration at one time caused a two-day shut down due to plugging with carbon dioxide ice;

(2) There is a continual increase in the percent of nitrogen, oxygen or any other gas non-condensible at the low temperature and these must be continually removed. We found that a surge tank, inserted in the gas line just after the ethylene condenser, where the gas is a liquid at 600 lb., with a bleeder to the engine fuel line solved this problem;

(3) After going below —50° F., the pipe and tank steel becomes so brittle it is entirely unsafe. The metals which retain a safe Charpy impact test value are, in the order of excellence, pure copper, bronze, Monel-metal, red brass, stainless steel and steel plate with carbon content less than .09 percent and nickel over 3½ percent;

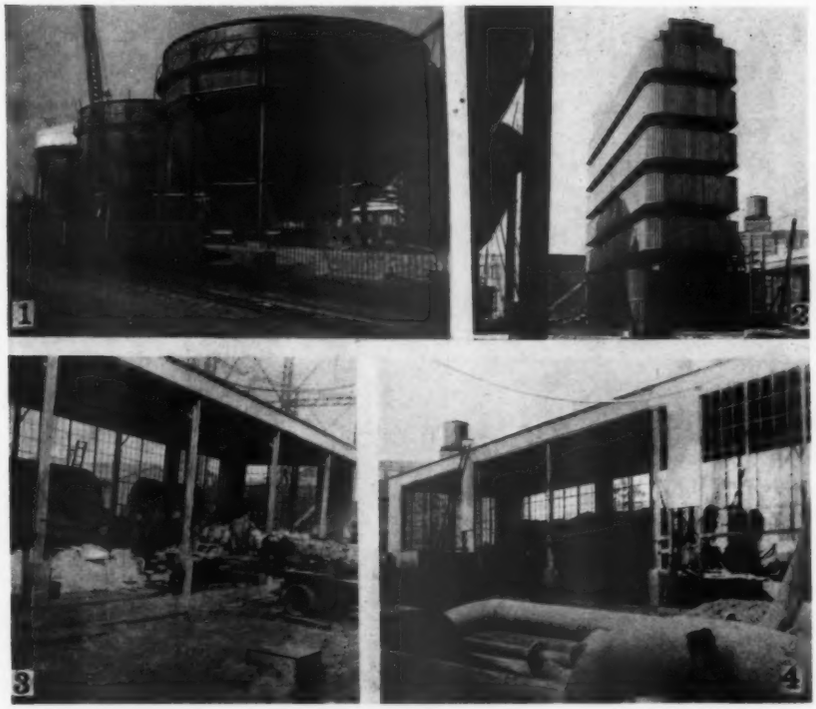
(4) The best heat insulator we have found so far is cork, although something better may be discovered later. Formed cork was used on the pilot tank, but we found that loose granulated cork between two walls gave still better results and was much cheaper. However, this must be kept perfectly dry to function properly. We have found a conservative coefficient of heat transfer in B.t.u. per square foot per inch of thickness per degree F. per hour to be .40;

(5) The evaporated liquid has exactly the same analysis as the raw gas used as feed. However, the evaporation from the stored liquid is entirely methane and eventually if allowed to stand for long periods, the liquid left will become increasingly higher in ethane plus content; and

(6) At —250° F., the molecular activity of the liquid is so low that it is an excellent insulator for itself, and to transfer heat into it the liquid must be broken up into very thin layers and its velocity must be kept very high and turbulent.

After operating the pilot plant almost constantly for four months, it was found that practically all questions had been answered, and it was shut down and has since been dismantled.

Very shortly, however, an opportunity presented itself to use the knowledge gained in these experiments. The city of Cleveland is supplied with natural gas principally through four 20 inch and 18 inch lines from the Hastings Station of the Hope Natural Gas Company, 150 miles distant. During January, 1940, the cold waves which hit every gas company in the east made it very difficult to keep the supply ample, and by spring, it was felt that something would have to be done to augment the available supply. Plans already made called for an extension of a 12-inch high pressure line to the city limits at a cost of approximately $2,500,000.00. However, after reviewing the work done at Cornwell and the plans and estimates based on these results, the officials of the gas companies involved decided that they could secure the same results by building a liquid storage plant at a cost of roughly $750,000.00 and au-



1:—Three liquid gas storage spheres under construction. Canvas tent shown over one on the left is used to keep cork insulation dry. 2:—Water cooling tower. 3:—Ethylene and Ammonia Gas end of compressor building. 4:—Natural gas end of compressor building with some of the welded piping in the foreground.

thority was given by them to go ahead with the plans. It is expected that this plant will be ready to operate by late fall, so that operations can be started and the storage filled by Christmas, making it available for this winter's peaks.

This plant, which is shown diagrammatically on the accompanying flow sheet, will be able to condense 4000 M.C.F. of gas per day and will have three storage tanks, each of 600,000 gallons capacity, equal to 50,000 M.C.F. of free gas, or a total storage of 150,000 M.C.F. The evaporators, which are steam heated, have a capacity to regasify 3000 M.C.F. per hour.

The feed gas will enter the plant from a city belt line at 30 lb. gauge, and will be compressed by a 600 horse-power engine to 600 lb. gauge, then going through the scrubbing plant to remove all water and carbon dioxide, after which it goes to the ethylene exchangers with high pressure gas on the inside and boiling ethylene on the outside, thereby chilling the gas to —126° F., and reducing to a liquid. After further chilling in the two flash gas exchangers to —139° F., it is cracked through the first expansion valve into the first expansion tank at a pressure of 55 lb. gauge. Here, about half of it remains as a liquid, and the remainder goes back to be recompressed and processed over again. The liquid from this tank is then cracked through the second expansion valve directly into the main storage tanks at a pressure of 8 lb. gauge, about 85 percent of it remaining as a liquid for storage, and 15 percent going into gas and being recompressed for further treatment.

The evaporated gas from the second stage, after passing through heat exchangers, is picked up and compressed to 55 lb. gauge by a 150 horsepower compressor. Here it joins the evaporated gas from the first stage cracking, and the combined stream is taken by an 800 horsepower engine and boosted to 600 lb. gauge, being then put back into the raw gas feed stream. This evaporated gas is practically pure methane.

The ethylene is contained in a closed circuit, where it is compressed, using 1200 horsepower at the flowing rate of 7000 M.C.F. per day up to 340 lb. gauge, and then is cracked through an expansion valve to 5 lb. gauge, reducing the temperature to —145° F., which is used to condense the high pressure gas.

The ammonia is also in a closed circuit, flowing at the rate of 3750 M.C.F. per day, and compressed by a 500 horsepower engine to 113 lb. gauge, and then expanded through a valve to 3 lb. gauge, reducing the temperature to —20° F., which condenses the high pressure ethylene.

The storage tanks themselves are two concentric spheres separated by 3 feet of cork insulation, formed in the lower half, to carry the load of the inner tank and its contents, and granulated in the upper half. The outer sphere is 60′ in diameter, made of tank steel and carried by legs down to a concrete footing. The inner tank is 54′ in diameter and supported entirely on the cork surrounding it. This tank is made of special steel with a .09 percent carbon and 3½ percent nickel, and is welded.

The evaporation equipment consists of three pumps that pick up the liquid from the tanks and raise its pressure to about 40 lb. gauge, the city belt line pressure. The gas goes to a two-stage heat exchanger with gas on the inside of the tubes and steam on the outside. There was already installed on the plant site 1400 horsepower of boilers which required only reconditioning to be put into service. The first-stage heater has double tubes, the liquid passing first through a ¾″ tube and then back between it and a 1″ tube, exposing a very thin high velocity stream to the heat. Thereby is added the heat of vaporization and the gas leaves at about —200° F. From the steam heater, it goes to a final four pass gas heater, where its temperature is raised to about 30° F., then through meters to lines.

The remainder of the plant consists of conventional water cooling towers, water pumps, etc.

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The Trend of the Domestic Base Load

by

George F. B. Owens,

Asst. Vice-President

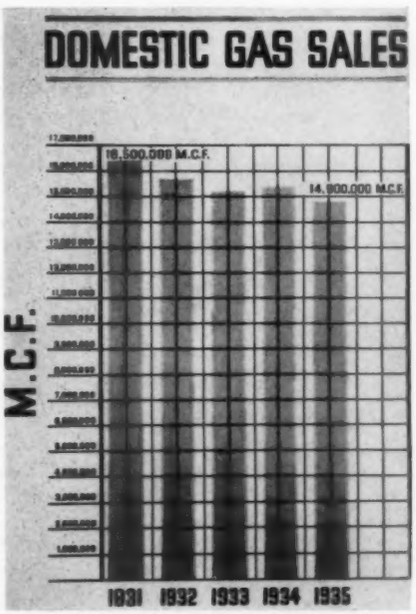
The Brooklyn Union Gas Company
Brooklyn, N. Y.

Introduction

THE DOMESTIC BASE LOAD has been variously defined. For purposes of this talk, I will consider it to be all the gas used by domestic customers exclusive of house heating. In discussing this subject, I will deal specifically with the experience of The Brooklyn Union Gas Company before and after January 1936. This date marks a turning point in the trend of our business.

Prior to 1936 our sales had been falling off at an alarming rate. This is indicated by the Chart A showing our annual domestic sales from 1931 to 1935. Whereas our domestic sales were 16,472,000 M.C.F. in 1931,

CHART A



in 1935 they totaled 14,856,000 M.C.F., a decline of 1,616,000 M.C.F. or approximately 10%.

To meet this situation we took drastic action and filed a revised rate schedule in December of 1935. These rates were designed to promote gas for house heating and to lower the cost of other domestic uses, especially water heating. We expended every effort to utilize our new rates with the hope of arresting the downward trend in sales. It was most important that we add load rapidly and in large volume as it was estimated that the new rates would reduce our annual revenues by approximately $1,000,000. What has happened since December 1935 is a matter of record.

Presented before the Commercial Section at A.G.A. Convention, Atlantic City, N. J., Oct. 8, 1940.

Factors Producing Changes in the Base Load

In analyzing the changes in the base load during the last four years, positive and negative factors must be considered. Gas sales will increase only when the positive factors outweigh the negative factors. This may seem academic but it is important because the negative factors are always present and the effective positive factors will be created by sales stimulation and growth.

The negative factors may be listed as follows:

1. **Deterioration of residential districts.**
2. **The effect of replacement of gas water heaters by coal stoves.**
3. **The large sales of oil burners—31,000 (est.) installed during the last four years.**
4. **Miscellaneous factors such as:**
   - **Changed living habits**
   - **Small electrical cooking appliances**
   - **Pre-cooked foods**
   - **Easy access to the country and shore.**

The positive factors may be listed as follows:

1. **30,000 domestic meters added last four years, which is 4½% of Domestic Meters**
2. **Appliance Sales**
   Effective load added last four years

Water Heating ..	**350,000 M.C.F.**
Refrigeration	**850,000 "**
House Heating ..	**1,700,000 "**

The Trend of the Base Load Since January 1936

On Chart B are shown two curves for domestic sales. The top curve represents the trend of total domestic sales and the lower curve the trend of base load since January 1936. Both curves cover 12 month periods and each month is expressed as a percent of the twelve months ended January 1936.

For the twelve month period ended August 1940, total domestic sales are up to 120%; for the same period base load sales are up to 105%. Regarding the trend line for the base load, sales held up through 1936, slumped off in 1937 and have been steadily upward since the latter part of 1937.

The negative factors continued at such a pace that the load added from increased appliance sales was not apparent in the base load until the end of the year 1937. Since then the base load has been accumulating at a faster rate than the losses.

Because the trend of sales during the last four years has been somewhat obscured by the growth in number of domestic customers, we

CHART B

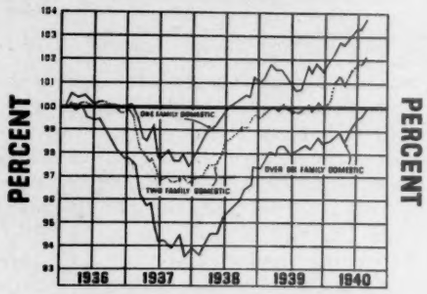
have prepared a series of curves on Chart C showing the trend of the base load consumption per meter of our three most important classes of domestic customers. As in Chart B, twelve month periods are used to remove seasonal variations and are expressed in percent of the twelve months ended January 1936. Of our total domestic customers, numbering approximately 701,000 the one family customers represent 18%, the two family customers 21% and the over six family or apartment house dwellers 30%.

A study of these curves show the

CHART C

THE TREND IN DOMESTIC BASE LOAD SALES PER DOMESTIC CUSTOMER

12 MONTH MOVING AVERAGE OF SALES-PER METER BY MAJOR DOMESTIC CLASSES



TOTAL DOMESTIC CUSTOMERS	701,000	100%
ONE FAMILY CUSTOMERS	129,000	18%
TWO FAMILY CUSTOMERS	145,000	21%
OVER SIX FAMILY CUSTOMERS	208,000	30%

over six family customers had the greatest decline in gas sales and were the slowest to recover. This loss may be attributed to decreased cooking consumption because approximately 50% of our total refrigeration sales were made to these customers during the period since January 1936. If no losses were present this new refrigeration load would have shown an increase of more than 180 cu. ft. per meter.

We sold more than twice as many house heating and water heating units to one family customers as we did to two family customers. The effect of these sales is readily apparent, the one family customers being the least affected and the quickest to recover.

The Importance of House Heating in the Trend of the Base Load

By comparing the trend of total domestic sales with the domestic base load trend in Chart D, house heating has accounted for most of the gas sales increase since January 1936. Though house heating gas is eliminated from the base load trend, its effect upon the latter is definite. The vital importance of house heating in building up the base load may be summarized as follows:

1. **Protects base cooking and refrigeration load**
2. **Simplifies replacement of electric refrigeration**
3. **Water heater load maintained if existing—added if not**
4. **House heating promotion is our best method of increasing and popularizing water heater sales generally**
5. **Dramatizes Gas Service**

What Effort Has Been Necessary to Increase the Domestic Base Load

Our efforts over the last four years in halting the losses in domestic sales have been continuous. During the period from 1936 to 1939, we have sold to our 701,000 domestic customers:

45,105 ranges or 1 out of every 15.5 domestic meters
60,942 refrigerators or 1 out of every 11.5 domestic meters
13,192 water heaters or 1 out of every 15 one and two family houses
8,266 house heaters or 1 out of every 24 one and two family houses

This volume of appliance sales amounts to slightly over $13,000,000. Stated in another way, our dollar sales per domestic customer since January 1936, amount to $18.50.

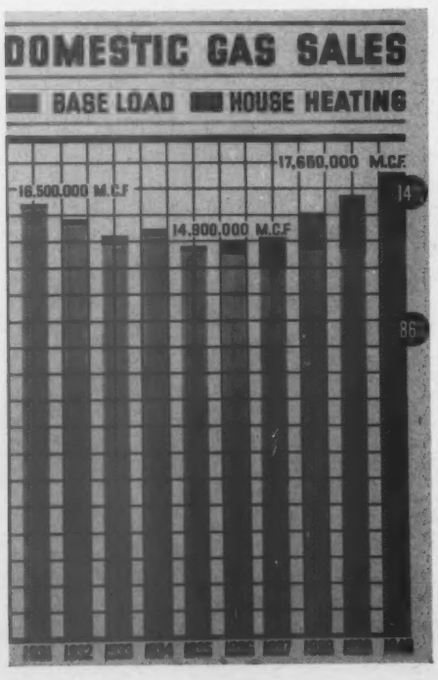
As a result of these appliance sales the base load has increased 5% since January 1936 and is still rising.

What Are We Doing to Keep Our Domestic Base Load Rising?

We believe the domestic base load will continue to rise by following the activities listed below.

1. Maintaining an able and enthusiastic sales department that will successfully promote cooking, water heating, refrigeration and house heating.
2. Integrating New Business and Commercial Departments to better public relations and increase sales.
3. Maintaining employee enthusiasm for the importance of appliance sales to them, to the company and to the customers they meet.
4. Continually promoting Dealer Cooperation.
5. Intensifying Home Service activities to obtain greater and more diversified use of gas for cooking in the home.
6. Increasing the quality of customer service commensurate with sound business practice.
7. Maintaining a continuous study of the economics of the gas business.
8. Diligent appliance research and market studies.
9. Reducing gas rates whenever possible.
10. Cooperating in national activities to spread the story and increase the use of gas.
11. Selling the public that the gas industry is modern, vital and growing.

CHART D



Conclusion

This last activity is a most important one for us today. The tasks and burdens of the last decade have caused a recrudescence in our industry. It is this renewed activity, this change of attitude in our thinking and doing that makes us different from yesterday. The consumer, the investor and the government must become aware of our awakened progressiveness. Aware of this change they become our greatest asset—a receptive public. There is a job to do—a challenge to meet.

I believe we will meet this challenge of selling the public that the gas industry is modern, vital and growing. What we have accomplished in the last few years can be improved upon tomorrow, for we have the benefits of our past mistakes and the foundation of those things that have proved successful and constructive.

Year Book of Gas Industry in Australia and New Zealand

Compiled and published by the statistical department of the National Gas Association of Australia, this 68-page volume includes the statutory particulars of gas companies in these two countries.

Following a list of the companies giving officers and financial structure there is a detailed analysis of production and progress shown by tabulation and many graphs.

The Association headquarters are at 368 Collins Street, Melbourne, C. I.

Carbonization of Coal-Oil Mixtures

By
C. J. Ramsburg,
Vice-President
and
G. V. McGurl,
Research Department, Koppers Company
Pittsburgh, Pa.

THE PURPOSE of this paper is to bring to your attention certain facts relative to the use of residuum petroleum oils, highly viscous fuel oils and other oils in the operation of coal-gas plants of the coke-oven type. The oil may be mixed with the coal in the hammermill and delivered to the ovens through the regular coal handling operations, or added to the coal at the mines or elsewhere.

Our experiences with the carbonization of coal-oil mixtures will be described in two sections:

I. The use of relatively large quantities of oil on the coal, 1.0 to 3.5% by weight for the purpose of increasing the yields of gas and other products and for providing added flexibility with regard to products in a by-product coke-oven plant.

II. The use of very small quantities of oil on the coal, 0.25 to 0.5% by weight, for the purpose of increasing the bulk density of the coal mix, thereby maintaining or increasing plant capacity and for controlling the moisture content, dust, and weathering of coals in transit or in storage.

I

Oil on Coal—1.0 to 3.5% by Weight for Increasing Plant Yields

Type and Cost of Oil

In most cases, fuel oil similar to bunker "C" grade has been used. In eastern plants oil of this type now costs about $1.25 to $1.35 per barrel of 42 gallons, delivered at the coke plant. This is equivalent to about $0.03 per gallon. These oils weigh 8.0 to 8.3 pounds per gallon and have a total calorific value of about 150,000 B.t.u. per gallon, at 60° F.

Application of Oil and Amount Used

Oils of the nature described must be heated to about 60 degrees Centigrade for handling. In most cases the oil has been added to the coal immediately before the hammermill in the coke plant. The only equipment required is a suitable pump with the necessary piping. A perforated pipe makes a satisfactory spray. If desired, storage tanks may be provided but generally the tank cars can be used.

The quantity of oil used has varied from 1.0 to 3.5% by weight of coal, or from 2.5 to 8.5 gallons of oil per net ton of coal.

Products per Gallon of Oil

Based on long experience with the use of oil, the following is a conservative estimate of the products recoverable from each gallon of heavy fuel oil added to the coal charged to the ovens in a coke plant. A heat and weight balance is included.

	B.t.u.	Weight
Gas—60 cu. ft. (Standard Conditions) at 1180 B.t.u. per cu. ft.	70,800	3.2 lb.
Tar—0.3 gallons	45,000	2.9 lb.
Coke—1.7 pounds (20% by weight)	24,700	1.7 lb.
Unaccounted for	9,500	0.5 lb.
	150,000	8.3 lb.

Light Oil—0.07 gallons (this is included in gas above).

These yields will vary considerably with different oils, oven temperatures, etc. but are believed to be representative.

Practical Application of the Process

Specific Gravity Control and Light Oil Removal

While a coal-gas plant of the coke-oven type has great flexibility in gas output and coke production, especially if provided with interchangeable producer-gas and coal-gas underfiring, any development which will increase the flexibility should be warmly welcomed, especially if such a change makes it possible to produce peak-load gas, remove light oil with cheap B.t.u. replacement, give a greater flexibility in ratio of coke production to gas output, and an increased control of gas gravity. We believe that the use of oil in coal mixtures will give such results. Such belief, however, is based largely on interpreted data but the experiments have been carried on for such a long time that the conclusions are justified.

The whole subject of the addition of heavy oil to the coal charge has been a research problem of ours for many years.

It was not until June, 1938, that a situation arose which gave the necessary impetus to the matter. At the plant of the Connecticut Coke Company, supplying gas for a large community, a light oil plant had been installed. Due to the necessity of maintaining a high specific gravity in the coal gas, the plant was designed to remove, from the gas, most of the toluene and xylene but only part of the benzene. If more of the lighter fractions were removed, the amount of producer-gas dilution in the debenzolized gas would have to be reduced to such a low point that the specific gravity of the send-out gas would fall below specifications.

Typical coke-oven gas production per ton of mixed high and low volatile coal, without light oil removal, amounts to approximately 10,800 cubic feet at 580 B.t.u. per cubic foot and 0.36 specific gravity. This volume of coal gas can be diluted with producer gas of 130 B.t.u. per cubic foot and 0.9 specific gravity to yield 12,100 cubic feet, per ton of coal, of 530 B.t.u. gas and 0.42 specific gravity.

Coke-oven gas contains about 3.0 gallons of light oil per ton of coal carbonized. If this light oil is removed, the diluted debenzolized gas amounts to 11,200 cubic feet, per ton of coal, at 530 B.t.u. and a rather low specific gravity of 0.37.

When coke-oven gas is the base load and carburetted water gas the variable, such a gravity of this coal gas might cause undesirable fluctua-

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tion in the specific gravity of the mixed gas.

At our Connecticut plant, this low specific gravity of 0.37 was not permissible so that light-oil removal had to be curtailed. This condition of incomplete light-oil removal, resulted in the decision to use cheap oil on the coal to replace the B.t.u. removed as light oil. We operated during a number of 10-day periods, "oil on" and "oil off," the results of which were most encouraging. It was then decided to make the addition of oil a regular procedure and a contract was made for the delivery of bunker "C" oil to the plant in standard, heatable tank cars. A pump was installed to put the oil onto the coal at the entrance to the hammermill, the oil being metered and the quantity synchronized with the coal quantity. This practice has now been continued for over two years and the procedure has been adopted in some of our other plants.

By using 6 gallons of oil per ton of coal, each gallon contributing 60 cubic feet of oil gas at 1180 B.t.u. per cubic foot, it was possible to remove light oil almost completely. Now, when light oil is removed, the debenzolized gas amounts to 12,100 cubic feet, per ton of coal at 530 B.t.u. per cubic foot and a specific gravity of 0.40.

The normal send-out of 530 B.t.u. gas has been maintained at 12,100 cubic feet per ton of coal at a specific gravity of 0.40 and about 3 gallons of light oil have been removed.

The net replacement cost of the light oil is low. Assuming that each gallon of light oil removes 133,000 B.t.u., about 6 gallons of bunker "C" oil (contributing 70,800 B.t.u. per gallon) are adequate to replace the B.t.u. removed per ton of coal. With oil at three cents per gallon, and a credit for tar and coke, the net cost of replacing a gallon of light oil is approximately three cents.

Prior to the use of oil on coal at New Haven, the light oil plant operated irregularly, light-oil removal being varied widely according to the specific gravity of the gas. It was possible to remove only about 1.6 gallons of light oil per ton of coal and maintain the required specific gravity in the debenzolized gas. For the past year and a half, using about 2.0% oil on the coal, it has been possible to remove an average of 2.5 gallons of light-oil per ton of coal. At times for extended periods the light-oil removal averaged 2.8 gallons per ton of coal. The high heating value of the oil gasses permitted added dilution of the coke-oven gas with producer gas; this, combined with the high specific gravity of the oil gasses, permitted more nearly complete removal of light oil, without decreasing the specific gravity of the gas below a required minimum. It is emphasized that the extra light oil recovered did not all come from the oil used. Rather, most of this light oil was already present in the coal gas and the use of oil permitted the removal of additional light oil while still maintaining a required specific gravity in the debenzolized gas.

No accurate determination has been made of the light oil produced from bunker "C" oil but we believe it to amount to about 7%, by volume, of oil used. Such light oil contains no paraffins in benzene or toluene fraction.

Experience at the New Haven plant has shown that by using bunker oil in the coal mix, a coal-gas plant can profitably recover 3.0 gallons of light oil per net ton of coal carbonized while maintaining the output and specific gravity of gas.

Another interesting and profitable use of oil on coal occurred in a plant where the specific gravity of the send-out gas had to be maintained at 0.45, a high figure for coke-oven gas. Generally it was necessary to damper the ovens a considerable time before pushing, in order that the lean gas of low specific gravity made near the end of the coking period be kept out of the gas. This was a decidedly wasteful manner of operating. By using about 1% of heavy fuel oil on the coal, the gravity of coke-oven gas was increased sufficiently to permit the collection of all the gas.

Increased Gas Capacity

Other situations than the recovery of the light-oil make the use of oil attractive. Peak-load gas is normally expensive on account of the standby equipment. In using oil, equipment is practically negligible. Since the oil is sprayed on the coal in the hammermill, the equipment may consist of tank or tank car, pump, meter, and means of synchronizing the flow of oil proportionate with the coal quantity. We have used successfully as much as 8.5 gallons of bunker "C" oil per ton of coal. This is not to be construed as the upper limit of the amount of oil which can be used. It is merely the maximum so far needed for our requirements.

If a plant is not removing light-oil, by the addition of 6.3 gallons of oil per ton of coal, the gas output may be increased in a very short time, when producer-gas underfired, as much as 8%, or from 12,100 to 13,100 cubic feet per ton of coal. When the light oil plant is in operation, this peak-load gas can be made available by slowing down the light oil recovery.

To make each M cu. ft. of peak gas, or additional gas, requires the utilization of 6.3 gallons of bunker "C" oil and 617 cubic feet producer gas to dilute the oil gas to 530 B.t.u. Against this cost, there is a credit for 1.9 gallons of tar and some 10 pounds of coke. The total cost of this peak gas is reasonable and in addition standby equipment cost is negligible.

During the first three months of 1940, one plant made and sold peak-load, or additional gas, to the extent of 5% daily average, reaching 10% for shorter periods when needed. This was gas over and above the volume which could have been made by the plant if oil had not been used on the coal.

Coke and Gas Production Flexibility

Another instance where oil may be used to advantage is in connection with large stocks of coke with a fixed gas demand. In such a case the output of gas may be increased 1,000 cubic feet per ton of coal which means that the coal carbonized and the coke produced may be decreased as much as 8% with producer gas underfiring and dilution. Actually, in one plant we have reduced coke production by 50,000 tons per year while producing as much or more gas.

While we have pointed out that it is exceedingly difficult to isolate exact results from the use of oil, one idea is paramount—when oil is mixed with coal and put in an oven, every B.t.u. in the oil goes to some useful purpose and has a higher ultimate value than its cost. Gas, tar, ash free carbon in coke, light oil, etc., must account for every molecule in some way and would seem an excellent outlet for such material.

Table No. 1 indicates how the flexibility of a 1,500 ton per day coke-oven plant may be increased by the utilization of some proportion of heavy fuel oil on the coal charged to the ovens.

In consideration of this Table it is at once apparent that in carbonizing the same amount of coal per day, that the method of operation can produce widespread variation in gas production. For example when operated as a straight coke oven (A) coal gas underfiring, the output of gas will be 10,200 M cu. ft. of 580

TABLE 1

VARIATION IN PRODUCTS FROM PLANT CARBONIZING 1500 NET TONS 75/25 MIXED COAL PER DAY, WITH CHANGING OPERATING CONDITIONS—COKING SPEED AVERAGE ONE INCH PER HOUR

	Coal Carb. 75 HV 25 LV N.T.	Oil Used Gal.	Gross Production: Total Gas M Cu.Ft.	Gross Production: Total Gas B.t.u.	Gross Production: Total Coke N.T.	Used for Underfiring: Coke Oven Gas M Cu.Ft.	Used for Underfiring: Coke N.T.	Used for Dilution: Coke N.T.	Used for Dilution: Prod. Gas M Cu.Ft.	Gas Send-Out: M Cu.Ft.	Gas Send-Out: B.t.u.	Gas Send-Out: Sp. Gr.	Coke Surplus N.T.	L.O. Recovered Gal.	Tar Produced Gal.
A. Coal Gas Underfired No Dilution No Light Oil Removal No Oil On Coal	1,500	0	16,200	580	1,080	6,000	0	0	0	10,200	580	0.36	1,080	0	11,250
B. Prod. Gas Underfired No Dilution No Light Oil Removal No Oil On Coal	1,500	0	16,200	580	1,080	0	165	0	0	16,200	580	0.36	915	0	11,250
C. Prod. Gas Underfired Dilution No Light Oil Removal No Oil On Coal	1,500	0	16,200	580	1,080	0	165	13	2,020	18,220	530	0.42	902	0	11,250
D. Prod. Gas Underfired No Dilution No Light Oil Removal 6 Gal. Oil Per N.T. Coal	1,500	9,000	16,740	599	1,087	0	171	0	0	16,740	599	0.37	916	0	13,950
E. Prod. Gas Underfired Dilution Light Oil Removal 6 Gal. Oil Per N.T. Coal	1,500	9,000	16,582*	569	1,087	0	171	10	1,618	18,200	530	0.40	906	4,500	13,950
F. Prod. Gas Underfired Dilution No Light Oil Removal 6 Gal. Oil Per N.T. Coal	1,500	9,000	16,740	599	1,087	0	171	18	2,880	19,620	530	0.45	898	0	13,950

*After light oil removal.

B.t.u. and the coke output 1,080 tons, or 9,440 cu. ft. of 580 B.t.u. gas per ton of coke for sale, equivalent to a total of 11,470 M. cu. ft. of 530 B.t.u. gas per day, or 10,600 cu. ft. per ton of coke.

In contrast to this we have a condition (F) where we secure an output of 19,620 M cu. ft. of gas per day with a net coke output of 898 tons so that the gas output per ton of coke for sale is 21,850 cu. ft. of gas, an increase of over 105%.

Condition (E) removing light oil with heavy oil addition shows an output of 18,200 M cu. ft. of gas per day. (F) shows that by shutting down the light oil plant, the output of gas per day could be increased to 19,620 M cu. ft. or 8%—practically immediately.

Condition (C) shows the maximum production of 530 B.t.u. gas without light-oil removal and no oil used on the coal. By the use of the specified amount of oil on the coal, the plant can, under condition (E), make the same volume of gas and recover 4,500 gallons of light oil, or, under condition (F), make an additional 1,400,000 cu. ft. of gas.

If desirable, scrubbing of light oil can be controlled to remove much of the toluene and xylene, leaving the balance of the light oil in the gas for producer gas dilution.

For higher peak loads we have used up to 8.5 gallons of oil per ton of coal with consequent further peak load output. This additional 2½ gallons would produce 600,000 cu. ft. per day.

In times of low gas output it is customary to vary the amount of producer gas heating. This makes it possible to make the full output of coke when desired and reduce the gas output. In cases such as this the oil would be cut to that amount which would allow the light oil to be removed while maintaining specific gravity of the gas at its standard figure.

Quality of Products

Gas

It has been stated above that one gallon of an average bunker oil will produce 60 cu. ft. (at standard conditions) of 1180 B.t.u. gas, when used as part of the charge to a coke oven. Assuming that no light-oil is removed from this gas it would be possible to use 97 cu. ft. of producer gas at 130 B.t.u. to yield 158 cu. ft. of 530 B.t.u. gas, which is about the average send-out gas. Thus, in any plant, it would be possible to increase the gas make considerably. The use of oil on the coal definitely increases the specific gravity of the total coke-oven gas. This is due to two things —the oil gas itself has a high specific gravity and the dilution with heavy producer gas is increased because of the higher heating value of the oil gas. At New Haven, the specific gravity of the partially debenzolized coke-oven gas was increased from 0.399 to 0.410 by the use of 1.73% oil on the coal, in spite of increased light oil recovery from 1.36 to 2.14 gallons per ton of coal.

Gas analyses are slightly different when using oil on the coal. Illuminants increase slightly and hydrogen decreases.

Tar

Each gallon of heavy oil added to the coal yields about 0.3 gallons of tar. This quantity varies with the oil used and oven temperatures and is a material credit to the oil cost. Many analyses have been made of the coke-oven tar produced when oil is used on the coal and there is apparently no significant difference between it and coke-oven tar made from coal alone. Exhaustive tests have been made on tar produced at a coke plant when using 0.0, 1.0 and 2.0% of oil on the coal. It was concluded that the tars produced in this plant under existing conditions did not show any properties which are unusual in coal tar.

Light Oil

The quantity of light oil produced per gallon of heavy oil used on the coal is difficult to determine as it has never been possible to obtain a long time test at any plant both with and without oil and with complete light oil removal. Based largely on small-

scale tests, it appears that one gallon of heavy oil on the coal will yield from 0.05 to 0.07 gallons of light oil. The toluene content of this added light oil cannot be determined but there is strong indication that it is as great or greater than in normal coke-oven light oil.

The use of oil on the coal in coke plants has not deleteriously affected the quality of the total light oil produced, in that there has been no increase in the paraffin content of the benzene and toluene fractions.

Coke

There is no apparent change in the appearance or quality of the coke produced from mixtures of coal with oil. The increase in coke cannot be determined accurately but it has been estimated at about 20% by weight of the oil used.

Bulk Density of Coal-Oil Mixtures and Oven Charge

When using these rather large proportions of oil on the coal, 1.0 to 3.5% by weight, there is generally a slight increase in the weight per unit volume of the mix over that of untreated coal. In most cases the weight of coal charged to the oven has remained the same, the oil used being charged in addition.

Underfiring Required by the Oil

It has not been possible to determine with any degree of accuracy the amount of heat required for carbonization of the oil added to the coal. Apparently the oil requires more heat per pound than does coal and an estimate of 1800 B.t.u. per pound has been made as the underfiring requirements of the oil.

Operating Conditions

There has been no difficulty in handling the mixture of coal and oil in any plant. There is a decided decrease in objectionable dust in conveyor galleries and in charging the ovens. It is interesting to note that in one plant during July, 1940, when gas output was low and it became advisable to discontinue the use of oil on the coal, there was a request from the battery labor force that the oil be again put in service as it made the work less difficult when the oil was in the coal mix. Coal, when treated with oil up to 3.5% by weight actually flows faster than untreated coal so that the charging time of the ovens has been reduced. Leveling time of the ovens has also been reduced. There has been no difficulty encountered in pushing the ovens when oil was used as part of the charge to the coke ovens.

Belts

Rubber conveyor belts used in handling the mixture of coal and oil will eventually show the effect of oil on the rubber. The belts tend to curl and fail to track in the idlers. Turning the belt occasionally has helped the situation but, in two plants which have used oil for a long time, the solution has been the installation of Neoprene belts. This belt change presents no great increase in unit oil costs.

II

Oil on Coal 0.25 to 0.5% By Weight of Coal for Purposes of Increasing Bulk Density of Coal Mixes, Etc.

Type and Cost of Oil Used

For the most part, when using *small* quantities of oil for the purpose of increasing or controlling the bulk density of the coal mix, and for preventing dust, moisture pick-up, and weathering, we have used a coal-spray oil (viscosity of 100 seconds at 100 degrees F.) to which had been added sufficient petrolatum to give an oil-free wax content of 7.5%. A similar coal spray oil without wax, and bunker "C" oil have been used for the same purpose, but were less effective.

For comparison, the costs of these oils at an Eastern plant are:

Coal Spray Oil with Petrolatum	$0.076 per gal.
Coal Spray Oil without Petrolatum 100 vis. at 100° F.	$0.061 per gal.
Bunker "C" Oil ...	$0.030 per gal.

Application of Oil and Amount Used

For the two larger tests conducted, the oil was sprayed on the coal at the mine as the coal was loaded into cars. In another test, the particular oil used was sprayed on run-of-mine coal as the coal was unloaded from a boat. In all cases, one gallon of oil was used per ton of coal, a high-volatile coal. In tests where oven charges were made this coal was used to the extent of 45 to 50% of the coal mix so that actually the coal mix contained only one-half gallon of oil per ton of coal which is about 0.2% by weight.

Moisture

There were definite indications that oil-treated coal (run-of-mine) which had been treated at the mine with one gallon per ton of an oil containing petrolatum, picked up less moisture than untreated coal of the same type. During storage in the open air in ninety ton piles, under identical conditions, moisture in untreated coal increased from 3.2% to 4.4% in three weeks and to 5.1% in eight months, while the moisture in the oil-treated coal increased from 3.4% to 4.0% in three weeks and was at 4.0% after eight months.

Weathering

After storage for eight months in ninety ton piles, this high volatile coal appeared to have weathered only slightly whether oil-treated or untreated. It is doubtful if the piles were large enough to obtain any indication of the weathering which would occur in plant storage piles.

Dust

The presence of oil on coal kept the dust down exceptionally well. After eight months of storage the objectionable dust in this coal was very low, about the same as when the coal was placed in storage. The untreated coal was dusty in both instances.

Bulk Density—Cubic Foot Box Weights

Many tests were made, using the standard A.S.T.M. cubic foot box, to determine the effect of small quantities of oil on the bulk density of coal or coal mixes. In all cases, an appreciable increase in bulk density was obtained, regardless of the type of oil used, provided that the coal had normal moisture content of 2.5 to 5.0%.

With a high-volatile coal at 4.9% moisture, treatment with one gallon of oil per ton, gave increases in bulk density of 7.8%, 8.4% and 9.1% for bunker oil, coal spray oil, and coal spray oil plus petrolatum respectively. Thus it is seen that the presence of petrolatum in the oil increases the effect on bulk density, but bunker oil alone is also effective.

When this same coal was used as 45% of a coal mix (this is less than 0.2% of oil in the coal mix), at 4.0 to 5.0% moisture, increases in bulk density of 14.8%, 17.1% and 17.9% were obtained for Bunker oil, coal spray oil, and coal spray oil plus petrolatum, respectively. Again the presence of petrolatum has increased the effect of oil, although the cheaper bunker oil is also effective.

It was determined that with a coal mix of only 1.0% moisture, the bulk

density of the plant coal mix was *decreased* by any proportion of oil from 0.25 to 2.0% by weight. This indicates a method of decreasing the bulk density of extremely dry coal, if desirable.

The same coal mix, with 2.5% moisture, increased from a bulk density of 43.0 to 47.0 pounds per cubic foot with 0.25% oil. Increasing the oil content above 0.25% gradually decreased the bulk density of this coal mix until it returned to the 43.0 pounds per cubic foot at about 2.0% oil.

In all of the tests, the coals used in any comparison had the same screen analysis.

Bulk Density—Plant Larry Car Weights

It was possible to increase the weight of coal in the plant larry cars by using, as 45 to 50% of the coal mix, a coal which had been treated with one gallon of oil per ton of coal. This is about one-half gallon of oil per ton of coal mix, or about 0.2% by weight of the coal.

The weight of coal in the larry car at 4.5% moisture increased as follows:

Coal Mix	*Coal in Larry Lb.*	*Increase Lb.*	*Increase %*
Untreated	23,625	—	—
Bunker oil added to coal 0.2%	25,550	1,925	8.1
Coal Spray Oil added to coal 0.2%	26,650	3,025	12.8
Coal Spray Oil and Petrolatum added to coal 0.2%	26,950	3,325	14.1

In the larry car the oil containing petrolatum caused the greatest increase in bulk density, although the bunker oil was also effective. The pulverization of the coal was the same in all cases.

Oven Charge Increase

At one plant, all of the ovens were charged for several days with a coal mixture containing about 50% of a high-volatile coal which had been treated at the mine with one gallon per ton of a coal spray oil containing sufficient petrolatum to give an oil free wax content of 7.5%. This is equivalent to one-half gallon of oil per ton of coal mix or about 0.2% of oil in the coal by weight.

Ovens which normally take 14.29 net tons of charge were operated at 15.00 tons for two days and at 15.25 tons for one full day. Five ovens were charged at 15.50 tons and five at 15.75 tons.

No difficulty was encountered in pushing or charging any oven.

It is seen that the oven charge could be increased by one ton in fourteen or about seven per cent. Increased daily charge at this plant under these conditions would be about 150 tons of coal mix.

Coking time and flue temperatures were the same during the test as for several weeks preceding but necessarily more gas was burned for underfiring the added coal.

The coke appeared to be normal and laboratory tests showed no difference on screen, tumbler, and shatter tests.

Expansion

In any plant using small quantities of oil to increase the bulk density of the coal mix, thereby increasing the oven charge, it is necessary that attention be given to the possibility of employing a mixture which may be dangerously expanding. It is possible that a certain coal mix is perfectly safe as far as expansion is concerned at low bulk density, but quite dangerous at a higher bulk density.

Advantages

The advantage of the use of small quantities of oil on coal to prevent dust and to control moisture pick-up is obvious.

The most startling and interesting effect of using small quantities of oil on coal of normal moisture content is the great increase in bulk density. It has been possible to increase the oven charge by one ton, an increase in plant capacity of about 7% or 150 tons of coal per day. Because of this added coal the gas make in the plant was increased by almost two million cubic feet per day. This increase in capacity is possible only if the additional coal can be carbonized in the same coking time as regularly employed without abnormally high flue temperatures.

The principal advantage of using small quantities of oil to increase the bulk density of the coal is in the possibility of maintaining uniformity of charge from day to day. Most plants have operating conditions adjusted for handling a coal of a given bulk density. In wet weather or when stock coal is used it is frequently impossible to secure the normal average weight of coal in the oven. It would be a decided advantage, if, by the addition of small quantities of oil when needed, the tonnage of coal charged to the ovens could be maintained at a constant daily figure.

There is a possibility that coal, although of fairly high moisture content, when treated with small quantities of oil may act like very dry coal. If such is the case and the result in charging is that the bulk density of the coal at all points in the oven is a more nearly uniform value than is secured when charging coal without oil, a decided advantage in heating the ovens would accrue.

The fact that levelling time has been reduced when oil is used on the coal indicates that such may be the case. Since the levelling bar makes fewer passes when oiled coal is used, there is less packing of the coal in spots.

Costs

No emphasis has been placed on the cost of using small quantities of oil on the coal to obtain the advantages outlined. The quantity of oil required is not great, about one-half gallon per ton of coal mix. Based on data presented in Section I of this paper it is reasonable to assume that the oil used will pay for itself in products.

Oil on Coal at Mine

Today, millions of tons of domestic coal are being dust-proofed with oil at the mines. The type of coal, size and geologic age are factors in determining the dust-proofing quality and quantity of oil to be used. Our experience leads us to believe that a blended oil, i.e. oil containing a quantity of material which will congeal on the surface is the most efficient type of oil for this purpose, and the more absorbent the coal is, the greater the difference that will exist between the amount necessary to use to accomplish a dust result as compared to an unblended oil. Experience at our own mines indicates that while domestic sizes may be made permanently dustless by the use of 0.6 to 0.7 gallons per ton, slack coal may need as much as 1.0 to 1.5 gallons per ton. We feel reasonably confident that the near future will witness an extensive use of oil at the mine for the treatment of commercial coal, and by-product coke-plant coal-supplies. This is particularly true in regard to low-volatile coal for storage. By spraying with a hot blended oil at the mine

many advantages may be secured. These include:

1. Less dust in handling and loss by windage and transportation;
2. Less moisture accumulation in shipment and storage;
3. Less oxidation, preserving the coking quality and by-product yields in the coal;
4. By the use of 1.5 gallons of oil per ton of low-volatile coal, the bulk density of the coal for coking will be maintained more nearly constant because:
   (a) The moisture will be maintained in wet or dry weather at about mine-moisture quantity.
   (b) By the mixture of 25% of such oil-treated low-volatile coal in a 75/25 mixture, the coal going to the oven will contain 0.4 gallon of oil in the mixture. This will have the force of overcoming any high moisture of the high-volatile coal and will increase the bulk density of the coal to normal.
   (c) If the high volatile coal is dry, the bulk density will be favorably reduced.

The cost of such treatment will be repaid not only in additional by-products but in uniformity of operation and further by the saving of windage and transportation losses.

If a coke plant intends to remove light oil, keep maximum gas output and preserve specific gravity, the effect of 0.4 gallon of oil will prove of no particular interest, since the B.t.u. recovered in light oil must be replaced by much larger quantities of oil.

But this factor in the situation—preservation of bulk density—must be of considerable interest to the steel-plant coke-oven operator where steady output of standard quality is paramount.

Briefly the advantages of using oil on coal are:

1. Maintenance of a definite specific gravity in coke-oven gas with removal of light oil. The B.t.u. from bunker oil are used to replace the B.t.u. in the light oil removed.

2. Maintenance of rather high specific gravity which is sometimes required in coke-oven gas.

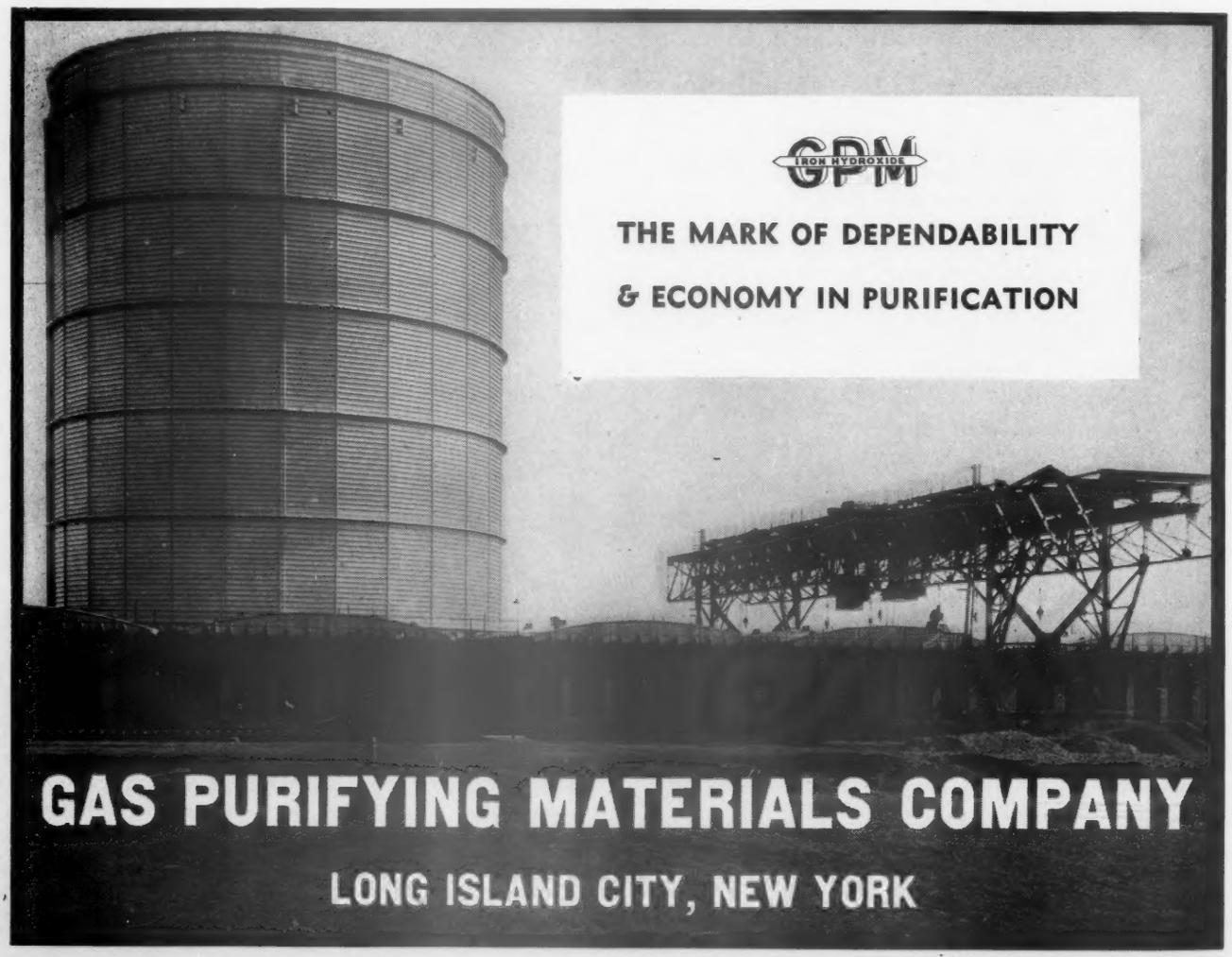
3. Maintenance of a definite volume of send-out gas with reduced coke production; this is valuable when coke stock piles are too large and gas must still be made.

4. Increase in plant capacity for gas. This is accomplished by charging the oil in addition to the normal weight of coal and carbonizing in the same time. This is additional gas which can be secured at reasonable cost, limited by the quantity of oil which can be so carbonized.

5. Increase in bulk density of the coal mix charged to the ovens, thereby increasing, or maintaining under all conditions, plant capacity for coal.

6. Decrease in dust, moisture pick-up, and weathering of coals in storage or in transit.

The use of oil on coal has in no way deleteriously affected the products, such as tar, light oil, and coke.



How Gas Men Helped To Save St. Paul's

(Reprinted from The Gas Times, London, September 21, 1940, Issue)

THE following article, from a special correspondent of *The Times,* giving an account of the part played by gas men in connection with the removal of an unexploded bomb from near St. Paul's Cathedral, appeared in that newspaper on Wednesday this week, and we reprint it here in view of its interest to all members of the industry.

"Civilian workers shared gallantly in the grand piece of work which saved St. Paul's Cathedral for Britain and the world. At one time the crater made by the time bomb was licked by flames from a burning gas main. This and a second fire which broke out later nearby were put out by workers of the gas company who toiled with the same disregard of danger as was shown by the men of the Royal Engineers who finally removed the bomb.

"But they worked deftly and quickly; they got through in an hour or two work which normally, taking all the usual precautions, would have occupied two days. Time was all important, and it was because these men overcame the two outbreaks of fire that the soldiers were able to get through to the bomb, remove it, and take it where it could be exploded without causing a major disaster.

"Yesterday I talked with some of these men. They were modest about their part, but, piecing together their undramatic accounts, one realized that they too risked all that St. Paul's might be saved, and this impression was confirmed by experts of The Gas Light and Coke Company who were in a position to assess the value of the work done by their men. For more than 12 hours, relieving each other from time to time, ten or twelve gas workers were busy around the crater in which lay a ton of high explosive.

The Men's Reports

"Their start of this job was reported to their headquarters in matter of fact language: 'Attended at 4 o'clock Thursday morning and found a leakage in the crater of an unexploded bomb. . . .' So the story goes on to the final sentence: 'Job cleared up by 4:30. The police were informed so that the R.E.'s could resume operations.'

"But in between brave men had worked hard and long, without refreshments, and within a few feet of a heavy bomb which might have gone off at any moment. A foreman who was in charge of the operations for some hours said that when he arrived he found two Royal Engineers badly gassed.

"They were about to be given milk, which he knocked away, for it was the wrong treatment, and he and a mate applied artificial respiration. Then he and three of his workers cut off the supply of gas and got the fire brigade to flood the main with water.

"Later there was a second outbreak of fire, and everyone flung himself to the ground, except Lieutenant Davies, who, quite unperturbed, remained standing on the edge of the crater. Again the flow of gas was stopped and the fire subdued.

"All this time the soldiers and the workers of The Gas Light and Coke Company had a wide area around St. Paul's entirely to themselves. All noise and movement in this usually busy part of the City was still. The quiet was unreal, the men say; indeed, where all around is bustle as a rule it was almost sinister and certainly disquieting.

"I was privileged yesterday to visit the underground headquarters from which the battle against damaged gas mains is directed. Thorough precautions have been taken. If these headquarters were to be bombed out of action two alternative centers are ready to be brought into use.

"As it is, it is working smoothly and continuously, quickly reducing to a minimum damage and inconvenience caused by Nazi bombs. On a large map is shown the 540 square miles of territory of The Gas Light and Coke Company, and pins with tops of different colors show exactly where gas mains have been damaged by bombs and the state of repairs.

"In charge is the distribution engineer. In peacetime his job is to see that the distribution of gas is fully maintained; in wartime his job is essentially the same, except that he has someone deliberately working to make his task more difficult.

"In peacetime he has his gangs ready to deal with damage or outbreaks of fire; in wartime he is much more prepared. He is running a continuous shift system, and wherever a bomb may drop causing fire or damage to a main he can dispatch a group of tough and skilled workers, who in quick time will have a fire out and in not much longer will have the main repaired and working again.

"The map, with its colored pins, is an encouraging pointer, for it tells a tale of triumph. As fast as the bombers damage any gas mains the company is repairing them. One pin stands for 'job completed.' It is in steady demand as another damaged main is brought back into use.

"Men here work and sleep on the job. The company's shock troops are ready to go into action over the 24 hours of each day. I saw a cradle in one underground passage, and the distribution engineer explained: 'The foreman sleeps on the job, and whenever there is a raid his wife and baby come in here for shelter.'"—*Times,* 18 Sept.

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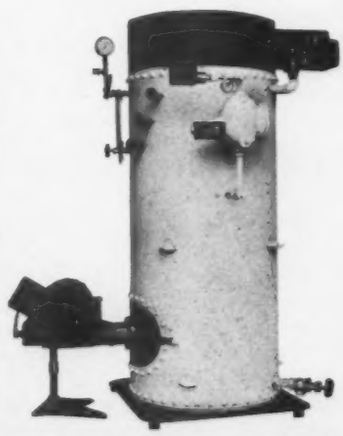

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Report of Joint Committee on Industrial and Commercial Summer Air Conditioning

Charles R. Bellamy, Chairman

Columbia Gas & Electric Corp.,
New York, N. Y.

THE YEAR 1940 has witnessed orderly progress in the field of gas summer air conditioning. Its most encouraging feature has not been any startling new discovery or development, but a growing realization on the part of gas company executives of the real status of gas summer air conditioning equipment and an appreciation of the cautious and difficult procedure that must inevitably be followed if equipment and markets, resulting in the widespread use of gas for summer air conditioning are to be developed.

Manufacturers of gas air conditioning equipment have improved their offerings or obtained valuable additional field test information during the current year. This work has resulted in new installations of gas summer air conditioning equipment and has clarified the lines along which future equipment development should take place.

The Bryant Heater Company has made a number of improvements to their line of continuous rotary silica gel dehumidifying units which were originally introduced in the Spring of 1939. In addition, this organization has expanded its line of rotary equipment by the introduction of an 800 c.f.m. unit to supplement the 500 and 1300 c.f.m. units previously offered. A number of interesting applications of these units and the older and larger stationary bed units offered by this company have been made, caring for dehumidification on comfort air conditioning installations or to meet special industrial drying or low humidity requirements.

The Mills Novelty Company has placed in experimental field operation fifteen or more ammonia absorption refrigeration systems of a unique new design. This interesting system employs a direct fired gas generator and a novel thermal transfer device for circulating fluids within the sealed refrigeration unit. The unit includes as an integral part an evaporative condenser so that the necessity for large quantities of city water for condensing purposes is eliminated. While the present experimental unit has a capacity of only two and one-half tons, the design provides for the storage of additional refrigeration effect to meet higher peak load requirements by freezing ice on the evaporator coils. The unit is designed for location outside of the building in which the refrigeration effect will be utilized so that any objections which might be raised to the use of ammonia as a refrigerant are eliminated.

The Pittsburgh Lectrodryer Corporation continues to offer equipment using activated alumina as a direct dehumidifying agent, designed to meet special industrial or commercial applications. While much of this company's equipment is used for the dehumidification of gases at high pressure in closed systems and employs steam or electrical heat for reactivation purposes, it is in a position to provide direct gas-fired dehumidifiers for special or general applications.

Servel, Inc., has continued with the development of a unit for year-'round air conditioning of a size suitable for residential use, which provides summer cooling and dehumidifying by means of a gas-fired absorption refrigeration system using water as the refrigerant and lithium chloride solution as the absorbent. The system is hermetically sealed and is designed to withstand the long layover periods common to air conditioning equipment without impairment in operating efficiency or physical condition of the apparatus. A single unit is designed to care for the entire domestic air conditioning requirement, providing circulation and cleaning of the air throughout the entire year and affording heating and humidifying in winter and cooling and dehumidifying during the summer. Gas is used as the major operating medium, though a conventional electric motor-driven fan is used for air circulation. While the present unit requires the use of tap water for condensing purposes during the summer season, the company has under development an evaporative condenser which will eliminate the present requirement for the supply and disposal of substantial quantities of tap water. Approximately twenty-five of these units have been manufactured in a pilot production plant and placed into practical field operation during this season.

The Surface Combustion Corporation is now offering absorption dehumidification units, using lithium chloride solution as the dehumidifying fluid and produced on a production basis. Two standard cell sizes with respective capacities of 3,000 and 4,000 c.f.m. are being offered. These units can be arranged in multiple to handle installations of almost unlimited capacity. Single units or multiple assemblies can be used to provide dehumidification for commercial or industrial installations of the larger than average size class. While for practical reasons steam must be used as the direct source of heat for regeneration of the lithium chloride solution, many of the installations made by this company obtain steam from gas-fired boilers. It has been stated that the goal of Surface Combustion Corporation is to raise the standard of results from air conditioning by providing independent control of dehumidification.

During the year 1940, the Williams Oil-O-Matic Heating Corporation has concentrated upon the modification of their absorption refrigeration system along lines which make possible the production of a sealed unit and the elimination of certain minor difficulties encountered in the field operation of prior designs. Fifteen units of this new design, each with a capacity of approximately thirty-five tons, have been constructed. Eight of these units have been placed in operation to provide air conditioning for the library at Tulane University. While these units are of relatively large capacity and, there-

Presented at the Annual Convention, American Gas Association, Atlantic City, N. J., October 7-10, 1940.

fore, command only a small market, their basic design features will be followed in the development of smaller systems suitable for caring for the average air conditioning requirement. It is hoped that within the next year or so it will be possible to develop a self-contained and sealed unit suitable for small commercial or domestic requirements.

It can be seen from the foregoing brief description of the activities and offerings of the major manufacturers that the gas industry does not have at hand equipment suitable for mass marketing for summer air conditioning purposes. A comprehensive offering of dehumidification equipment is available which can meet many specialized industrial drying or low humidity requirements and which can be used in conjunction with some independent cooling means to care for the dehumidification phase of many commercial air conditioning applications. It is apparent, however, that in the average commercial air conditioning installation this equipment can only care for part of the requirement, and, therefore, must be considered as an accessory to the system as a whole. The present offering of gas operated absorption refrigeration equipment is distinctly limited in scope and availability. It could be fairly said that all systems of this nature from the standpoint of comfort conditioning, are still in a developmental stage. It must be emphasized, however, that all of the absorption refrigeration systems described have very interesting possibilities, particularly in those areas where favorable gas rates prevail, and that all of these systems have demonstrated their ability to operate satisfactorily.

In its 1939 report, the committee presented a discussion of the present sales status of summer air conditioning with gas, in which attention was given to the practical operation of sales outlets in the general air conditioning field. The situation in the general air conditioning field and the inevitable relation of the gas industry to this field has not changed during the past year. An analysis of the equipment offerings described heretofore will indicate that their sale must dovetail with the sale of other air conditioning equipment, and that their installation can in many cases be most properly handled by those engineering and contracting firms making conventional air conditioning installations.

In its 1939 report, the committee recommended that the American Gas Association obtain the services of a qualified individual to act as coordinator between the manufacturers of gas air conditioning equipment and the various gas companies in the task of applying gas air conditioning equipment to practical problems. This proposal was accepted in principle by the Executive Board of the American Gas Association, though for various reasons it was not made effective. The committee still feels that this proposal should be made effective, for experience in conference and sales efforts during the past year has indicated more clearly than ever that gas company executives could well use an unbiased guide to assist them in solving the problems presented in applying available gas summer air conditioning equipment in various territories. The committee feels that it is essential that such gas air conditioning equipment as is available continue to be applied, for it is only through practical application that sound future development, together with discovery of new and broader fields of application can be achieved. It will be necessary, however, to continue to discriminate between the availability of some equipment, suitable for some purposes, and the ability to embark on a mass merchandising program for gas air conditioning equipment. In the ever changing and developing air conditioning field, the committee feels that the gas industry needs the services of a qualified full time observer and counselor to assist in charting the correct course toward a bigger gas summer air conditioning business. With such guidance, gas companies can avoid discouraging blind alley efforts and face with understanding the difficult task of penetrating the summer air conditioning field.

The committee would like to call attention to preliminary reports, presented hereafter, on two research projects which are being conducted since last spring under the joint auspices of the American Society of Heating & Ventilating Engineers and the American Gas Association. Final and official reports of these activities will be presented before the winter meeting of the American Society of Heating & Ventilating Engineers, and should be of great value to the gas industry, since they will for the first time identify the American Gas Association and gas summer air conditioning equipment with the authoritative research activities of this technical society.

The committee also calls attention to the portions of this report prepared by members of the committee who represent the several manufacturers.

Research Project
Study of Summer Cooling in the Research Residence at University of Illinois, Urbana, Ill.

(Supervised by the Joint Committee on Summer Air Conditioning for the Committee on Domestic Gas Research)

THE research residence of the National Warm Air Heating and Air Conditioning Association located near the campus of the University of Illinois, Urbana, Illinois, was erected in 1924 for the purpose of conducting field studies in warm air heating. Although the residence is owned by the Warm Air Heating Association, the heating research work is conducted under a cooperative agreement between the Association and the Engineering Experiment Station of the University of Illinois.

With the introduction of summer cooling for residences in the early thirties, the American Society of Heating and Ventilating Engineers and the National Warm Air Heating and Air Conditioning Association jointly sponsored the first study in summer cooling in the residence in 1932. With the exception of 1939, this work has been continued each summer, and it has included cooling with ice, city water at several different temperatures and mechanical refrigeration. Special studies, incidental to the major ones, have included tests showing the effectiveness of awnings, attic ventilation and the circulation of outdoor air at night. The results of the work have been published in the *Journal* and the *Transactions* Vols. 39 to 45 of the American Society of Heating and Ventilating Engineers, and in three bulletins* of the Engineering Experment Station of the University of Illinois.

Figure 1 shows the research residence, a two and one-half story dwelling of frame construction. The first and second stories, with the exception of the sun porch, is the space which has been cooled each season. This includes a living room, dining room, kitchen, three bedrooms, bathroom, and hallway having a total vol-

ume of 14,170 cu. ft.

During the summer of 1939 the residence was fully insulated with full thickness rock wool, and one of the primary objects of the 1940 summer cooling tests was to secure data which would permit a comparison of the operation of the insulated residence with that of the uninsulated residence.

Figure 2 shows the central cooling plant consisting of a silica gel gas fired dehumidifying unit, dry air cooler, and a resaturation cooler, along with some of the necessary instruments and measuring equipment

Figure 1. Warm air heating research residence at University of Illinois, Urbana, Illinois.

to secure the test data. The plant is located in the basement and connected directly to the same duct system which is used for heating with forced flow warm air. Provision is made for introducing outdoor air during the day for ventilation purposes, and for the circulation of outdoor air on cool nights for the purpose of reducing operating costs.

The plant was designed to maintain indoor conditions of from 78-80° F. dry-bulb temperatures and relative humidities between 45 and 50 per cent. The outdoor design conditions used were 95° F. dry bulb and

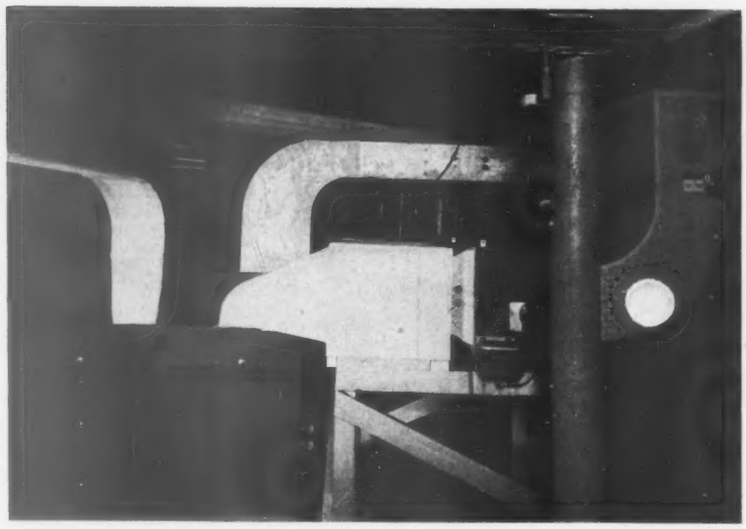

Figure 2. Central cooling plant with dehumidifying unit, dry air cooler and resaturation cooler—Research residence, University of Illinois.

76° F. wet bulb. The total amount of air circulated during the day was about 800 c.f.m., and equivalent of 3.4 air changes per hour. Of this amount, 240 c.f.m. and equivalent of one air change per hour was air brought in from the outdoors for ventilation purposes. The temperature of the water used in the dry air cooler and in the resaturation cooler was about 75° F.

Two primary series of tests were made. They were similar, with exception of the night operation. In one series, whenever the outdoor effective temperature at night was lower than that indoors, the cooling plant was turned off and air from the outdoors was circulated through the house. Under this method of operation 1500 c.f.m. of air, or 6.3 air changes per hour, was passed through the residence. In the other series of tests the house was kept closed both night and day.

While the summer weather in 1940 was not as severe and as prolonged as during some other seasons, sufficient data were obtained to form the basis of a paper for presentation before the American Society of Heating and Ventilating Engineers.

Research Project
Summer Cooling Requirements at Low Relative Humidity

(Supervised by the Joint Committee on Summer Air Conditioning for the Committee on Industrial Gas Research)

THE Joint Committee on Summer Air Conditioning, of the American Gas Association, completed a cooperative arrangement with the Committee on Research of the American Society of Heating and Ventilating Engineers, whereby the latter organization is making in its Pittsburgh laboratory a study of the summer comfort cooling requirements when low relative humidities are maintained.

The purpose of the study is to augment the results of earlier research by the American Society of Heating and Ventilating Engineers dealing with cooling requirements for the comfort of persons when relative humidities ranging from 50 to 70 percent were maintained. In the current study relative humidities of approximately 30 per cent are the major object of investigation, with minor attention being paid to relative humidities as low as 15 per cent.

The earlier studies[1] were limited to the higher humidities because of limitations in the air conditioning system supplying conditioned air to the society's psychrometric rooms. In order to make the study of lower relative humidities possible additional conditioning equipment, including two silica-gel absorption units, one for each of the two rooms, was installed; this made it easily possible to maintain the lower humidities desired for the investigation with a possible low limit of approximately 15 per cent.

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* Bulletin No. 290, "Investigation of Summer Cooling in the Warm-Air Heating Research Residence" (results of studies conducted during 1932, 1933 and 1934, using ice, circulation of outdoor air at night, and mechanical refrigeration) price $1.00.

Bulletin No. 305, "Summer Cooling in the Warm-Air Heating Research Residence with Cold Water," Aug. 1938 (Results of summer cooling studies conducted during 1935 and 1936 using water at temperatures of 58° F., 52° F., and 46° F.), price 90 cents.

Bulletin No. 321, "Summer Cooling in the Research Residence with a Condensing Unit Operated at Two Capacities," March 1940, price 70 cents.

These publications may be obtained by addressing the Engineering Experiment Station, University of Illinois, and remitting the amount of the charges by postal money order made payable to the Engineering Experiment Station.

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[1] *Summer Cooling Requirements in Washington, D. C., and Other Metropolitan Districts by F. C. Houghten, Carl Gutberlet and Albert A. Rosenberg; A. S. H. V. E. JOURNAL, September, 1939.*

The program for the current study was developed during the early part of the year, and the actual investigation initiated at the A. S. H. V. E. Laboratory in Pittsburgh early in the cooling season under the society's Technical Advisory Committee on "Sensations of Comfort." This subcommittee of the Committee on Research, consisting of Thomas Chester, chairman, C. R. Bellamy, E. P. Heckel, W. S. Kilpatrick, Dr. W. J. McConnell, A. B. Newton, B. F. Raber, C. Tasker and L. C. Soule, has been responsible for the extensive study of air conditioning requirements for comfort carried on by the society. While the current cooling season has not offered everything in the way of hot weather to be desired for a study of this kind, the A. S. H. V. E. Research Laboratory has been able to study intensively the cooling requirements of several trained male subjects in conditioned air at 30 per cent relative humidity.

The course of this study has followed closely that of the studies resulting in the research report referred to above. The effective temperatures found necessary for comfort at 30 per cent relative humidity have ranged between the outer limits of 69° and 71° E.T. with an indicated optimum of approximately 70° E.T. This is in fair agreement with the requirements as found in the earlier studies for higher relative humidities, with a slight indication that a lower effective temperature is desired with the drier air. Whether this lower temperature is due directly to the lower humidity or to the cooler weather prevailing this summer cannot yet be concluded; however, any possible variation from earlier findings at higher relative humidities which the completed study may conclude will be relatively insignificant.

Similarly to the earlier studies, it is found that a person is more sensitive to cool atmospheres (complains more quickly when the temperature is slightly too cool) than to warmer conditions. The range over which different persons may be comfortable on the same day, or at which the same person may be comfortable on different days varies by approximately plus or minus 2½ deg.

The study indicates no unusual sensations for air conditions at 30 per cent as compared with higher relative humidities. There are, however, some indications that when the relative humidity is reduced to as low as 15 per cent slight drying of the lips and the outer nasal passages is noticeable.

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The Selling Parade

A Digest of Successful Selling Ideas

By
Charles B. Roth

WHEN I WAS FRESH out of college, the first job I got was that of selling for an investment house. I was at what the chancellor of our school termed "the pliable age." Which means I believed everything I heard, so it wasn't hard for me to fall for the sales traditions of the business.

These ran as follows: You can't make sales on Saturday mornings; better stay in the office and talk with the boys. You can't do any good calling on prospects before 10 in the morning: they're busy opening their mail. And don't call before 2 in the afternoon—they are not back from lunch. Don't work when it is raining, and skip all calls during July and December.

Reckoning how much time that meant off, I decided that I was in the grandest business in the world.

One day when some of us boys were sitting on our desks talking, waiting for 2:30 to come, so we could go out and make calls until 4, we saw a man plodding down the street.

"There goes Fred Aspen," said one of the boys.

"Who's he?"

"You don't know Fred Aspen! Why, he's the best bond salesman in the game."

"Where's he going at this time of the day?" I asked. "It's only 1:30."

I was told that Aspen was a fool. He spent 10 hours a day going from one office to another, making calls.

That was when I learned the lesson that a man should always refrain from adopting the traditions that hover around an industry or an organization. I have honestly come to believe that if a salesman will reject all traditions, and beat out his own trails, he will get ahead farther.

Aspen, by ignoring the things the rest of us fatuously believed, by working when the rest of us knew it did no good to work, earned three or four times as much as any other man in town.

I came to know this man Aspen later. He told me that he was a victim of the non-work philosophy for several years. Then he woke up, and decided that his business was no different from any other. It paid out on work. He started working early, quit working late. He worked as hard in July and in December as in any other month. He was an iconoclast—he broke traditions and paid a large income tax.

* * * *

"THE HARDEST COMPETITIVE situation I ever had to meet?" The veteran salesman repeated my question. "Let me see . . . oh, that's easy. It was working against Bill Barker."

"Who was Bill Barker?" I asked.

"Just an ordinary salesman in Kansas in the early days," said he. "But to me he was a thorn in the side. Don't misunderstand. Bill was a fine fellow; and as straight as a die in his business methods. But he got all the business, and I got not a smidge in the territory he called his. And I was young and ambitious, and I had a fire-eating, whip-raising boss.

"Bill's gone now, and although we fought each other tooth and nail, I don't think another salesman ever lived who was a better salesman or who taught me more about the game."

I became interested in Bill Barker. What manner of man was he? I wanted to know. What methods did he pursue that he was so successful? What was the secret of his power?

"Oh, Bill was a big, easy-going chap, nothing flashy, but he had something I have spent a lifetime in trying to get for myself: the absolute confidence of every man he talked to.

"Every one of his customers had this feeling about what he said: 'If Bill Barker says I ought to have this, I ought to have it.' If a dispute arose about a bill the customer would say: 'If Bill Barker says this bill is right, it is right.'

"Say, when you buck that kind of thing for five years you have tremendous respect for a personality big enough to create it."

"How did Bill Barker build such a reputation?" I asked.

"By deserving it. He never let a customer down. He never told a customer a lie. He never put his interest or his firm's above a customer's. No wonder he was so successful—he deserved to be," concluded the veteran salesman.

* * * *

A GREAT BUSINESS personality died in America a few years ago. General T. Coleman Du Pont was his name. I have often felt that it was he as much as anyone else who was responsible for the tremendously rapid way in which his great enterprise grew. And I believe I know why it grew so fast under his hands.

He was a selfish man. I do not mean this in a derogatory way. I mean that he was intelligently selfish. He wanted his company to do, not its share of the business, but *all* of the business. He often said so. When asked by a reporter if he was satisfied with his share of a market, he replied that he was not. He wanted all the market. He wanted every customer.

Do not think from this that the General was a predatory citizen, for as he explained to his interviewer, if his company could serve better products to a customer at better prices, why was it not to the advantage of the customer as well as to his company to get all the customer's business?

Naturally, he didn't get it all. But the goal he set—the entire melon—was something which kept him and his associates in fighting for business every minute.

Just yesterday I was talking to a salesman about how things in his business were.

"Oh, all right," said he. "I get my share."

"Are you satisfied with your share?" I asked him.

"I sure am. Why not?"

But I wouldn't be satisfied if I were in his position, and I told him so. I would want more than my share, and I'd try to get more—and when the score was counted I would have more than the evasive thing called my share.

That's the way a business grows, by getting more than its share, and that is the way a salesman keeps out in the front.

I wonder if this will sound like selfish, cruel, hard, predatory talk to you? I hope it will not. I do not want it to be, but in the last few minutes I have been setting down some of the realism of business—hard-pan facts that, if you heed them, might make a difference in your earnings of several thousand dollars a year.

* * * *

I THOUGHT DURING the first few minutes he was with me that I was meeting a first-rate salesman. He was smooth, finished, convincing, pleasant. And he did know his story. But then he made a slight error, which told me I wasn't in the presence of a champion.

He asked if he might sit down.

Usually I am polite to salesmen, ask them to be seated, thank them for coming in. But he was a stranger and I wanted to test him. So I left him standing. About three minutes of it was enough, and he invited himself to sit down.

Nothing wrong in that, is there? Not much. Only enough wrong to give the buyer the advantage in the interview, if he wants to take the advantage. You see, the salesman should never ask permission to sit down, nor should he sit down without being invited to. Both these things are slight breaches of the etiquette of business, and are enough to offend a fastidious or touchy buyer, both of whom are legion.

What should a salesman do?

He should remain standing during the interview, unless the buyer asks him to sit down, and if the buyer asks him to sit down he should. He should let the buyer set the tempo and the character of the hospitality during the interview.

Even if the buyer doesn't ask you, as a salesman, to sit down, you haven't lost anything. To the contrary. You have gained. A standing man is at an advantage over a man who is seated; his very presence towering above the other man is a physical advantage which reflects itself in the salesman's sense of mastery. Besides, you can be much more emphatic, much more active while standing than while sitting. Try it in front of a mirror sometime. See how much larger and more convincing you appear when standing than when sitting. It is hard, indeed, to become very convincing or dynamic while sitting down.

BARBER GAS
Conversion BURNERS

Only patented Barber Jets give correctly balanced air-and-gas pre-mixture for complete combustion, and 1900° flame temperature on atmospheric pressure. HIGHER EFFICIENCY — because all Barber Units, for either round or oblong furnaces and boilers, are properly adjustable to fit the grate, and to lay a perfectly controlled barrage of "scrubbing" flame action directly on walls of fire box.

Thousands of heating dealers and gas companies know that Barber Burners mean EASIER sales and more LASTING satisfaction. Ask about Barber Burners for Butane Gas. Write for Catalog on Conversion Burners, Appliance Burners, and Regulators.

No. 324—B BARBER BURNER

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio

BARBER Automatic JET GAS BURNERS
for Furnaces, Boilers and Appliances

TITAN WATER HEATER CONTROLS

AGA Approved
TITAN Temperature and Pressure Relief Valve

This device is installed on the hot water outlet in the tank directly in the flow of water. Action, as a result, is unfailing and positive, there being no dead pockets to prevent proper functioning of relief valve.

Pressure relief is obtained through a spring-loaded valve which opens when the pressure reaches a predetermined point. Should the water become overheated to 200° F, a fusible disc melts and lets the water escape thereby preventing a further increase in temperature.

The Titan Relief Valve serves as a coupling connected in the line thereby eliminating the necessity and expense of a tee fitting. To replace fusible disc, it is not necessary to disassemble valves or piping in any way.

Design for application to storage or range boilers. Prevents corrosion, scalding and explosion.

Catalog and full information upon request.

The Titan Valve & Manufacturing Company

Thermostats • Safety Pilots • Relief Valves • Safetystats
9913 Elk Avenue Cleveland, Ohio

News of the Gas Industry

"How To Train Men Quickly"

Practical Pointers for Department Heads, Supervisors and Foremen

There is no problem confronting industry more urgent than the necessity of intensively training men. Shortages of skilled labor to meet expanding industrial requirements, conscription of workers, and rapid increases of working forces are already putting tremendous pressure on those responsible for training and instructing workers.

The bottle-neck of the training problem will certainly be more and more at the point of supervision. On-the-job training must be done largely by those who supervise the men being trained. To meet the great need on the part of foremen, supervisors and department heads for practical information and guidance in their training job, a series of full-page articles on the subject, "How to Train Men Quickly," will commence the week of October 28th in "Management Information."

"Management Information" is a weekly bulletin published by Elliott Service Company, 219 East 44th Street, New York, N. Y., and edited by Glenn Gardiner and Associates. It will be recalled that Mr. Gardiner presented an outstanding paper before the 1936 Convention of the American Gas Association on the subject of "Employer-Employee Relations in the Gas Industry." His address was published in the December, 1936, issue of AMERICAN GAS JOURNAL.

The subscription price of "Management Information" varies with the number of copies and will be quoted on request.

Natural Gas for Eureka

Eureka, California, is to have natural gas after nearly sixty years of manufactured gas. The new fuel probably will be introduced during December. About 2000 customers will be benefited by the change.

Eureka's supply of natural gas will come from three wells which the Texas Company recently completed near Fortuna, as part of an extensive exploration program.

To transmit this gas to Eureka, the P. G. and E. is constructing 14 miles of 4-inch steel pipeline from the wells to its gas plant in the community. There it will be connected with the city-wide distribution system. The project is costing $87,232.

Gas Companies of Southern California Plan Merger

F. S. Wade, president of Southern California and Southern Counties Gas Companies, announced on October 11 that the Southern California, Southern Counties and Santa Maria Gas Companies had under consideration a plan to merge the three companies into a single operating unit, subject to the prior approval of the Railroad Commission of the State of California. The united group would take the name of Southern California Gas Company.

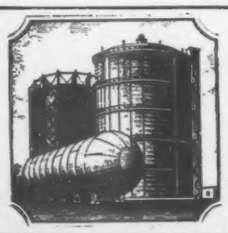
In explanation of the move, Mr. Wade said: "Recent events have forced the conclusion that the best long term interests of the operating companies in the Pacific Lighting Group will be served by an early merger. During recent negotiations which led to the sale of $30,000,000 of thirty-year 3¼% bonds of Southern California Gas Company, it became apparent that the future financial needs of all the companies could be better handled if there were only a single company."

As to the effect of the merger on the operations of the companies involved, Mr. Wade stated: "For a number of years the three companies, operating under a common ownership, have been closely coordinated in policies and practices. There is very little duplication either of facilities or forces. Consequently but few changes appear probable under the expected merger. The new arrangements are primarily for financial reasons."

The combined companies, if merged as planned, would have nearly one million individual active gas meters and would form one of the largest and strongest natural gas companies in the United States. At present Southern California Gas Company serves 783,000 customers, Southern Counties Gas Company serves 188,000 customers, and Santa Maria Gas Company serves 11,000 customers.

EMPLOYEES OF THE KANSAS CITY GAS COMPANY HONOR T. J. STRICKLER

When Major Strickler returned to his office after being elected president of the American Gas Association, he found his office filled with flowers. They were from the 500 employees of his Company. It is needless to say that the Major transacted little business that day because he declared open house and all of the employees who could leave their jobs were invited to visit him in his office.



STACEY BROTHERS
Gas Construction Co., Inc.
"STACEY-KLONNE" & TELESCOPIC GAS HOLDERS "STACEY BULLET" PRESSURE HOLDERS
PURIFIERS AND STEEL PLATE CONSTRUCTION
Executive Offices: Cincinnati, Ohio
Eastern Office: 21 West St., N. Y. C.

Tattersall Elected Vice President Niagara Hudson Power Corp'n.

The election by the Board of Directors of Charles A. Tattersall as a Vice-President of Niagara Hudson Power Corporation was announced today by Alfred H. Schoellkopf, President of the Corporation. Mr. Tattersall continues as Secretary of the Corporation.

Photo Blank & Stoller

Charles A. Tattersall

Mr. Tattersall's connection with the Corporation and its subsidiary companies extends over a period of 32 years. He was employed in various departments of The Niagara Falls Power Company and predecessor companies and in 1919 became Assistant to the Vice-President and General Manager. In 1927 he became Assistant to the President of Buffalo, Niagara and Eastern Power Corporation and later was elected a Vice-President. He was also made an Assistant Vice-President of Niagara Hudson Power Corporation in 1931 and became Secretary of the Corporation in 1935.

Mr. Tattersall is a member of the Executive Board and Chairman of the Publicity and Advertising Committee of the American Gas Association and a member of the Executive Committee of the Empire State Gas and Electric Association.

Newbell Leaves Roper to Join H. H. Monk Agency

Rhoades V. Newbell, formerly associated with the Geo. D. Roper Corporation, Rockford, Illinois, has resigned to accept an appointment as Account Executive with Howard H. Monk and Associates of that city.

Mr. Newbell has had wide and varied experience in the advertising and sales promotional fields. In 1939, he joined the advertising staff of the Roper Corporation where he edited dealer publications and created complete appliance selling plans for dealers and utilities.

In his new capacity, Newbell will join the Plan Board of the agency and assist in the preparation of national programs for the twenty-three clients served by Howard H. Monk and Associates.

Gas Water Heaters and Attachable Gas Water Heating Units Requirements Brought Up to Date

Consistent with the gas industry testing and approval program of continuously striving to provide better appliances for the public's use and responsive to new improvements in gas water heating equipment, the Subcommittee on Approval Requirements for Gas Water Heaters and Listing Requirements for Attachable Water Heating Units recently completed for criticism tentative revisions to the American Standards under its jurisdiction. On October 10, 1940, these two sets of specifications were mailed to all gas water heater manufacturers, gas companies and other interested individuals.

Of particular interest to manufacturers and gas companies are recommended revisions to the current American Standard Approval Requirements for Gas Water Heaters permitting the approval of single faucet type water heaters without draft hoods and still retaining all essential safety features for that type of installation. This type of water heater has within recent years enjoyed an increasing demand for various uses and particularly in homes not previously piped for hot water supply. Such heaters must be equipped with automatic pilots and with a single faucet so attached and made a part of the appliance that no other water outlet could be attached for distant operation of the water-gas valve. A third essential requirement specifies that satisfactory combustion must occur with the flue outlet completely blocked to preclude any hazard resulting from the operation of this type of appliance.

In recognition of the rapid progress in construction and performance characteristics of automatic pilots which are incorporated in water heaters to prevent the escape of unburned gas, specifications thereon were considerably strengthened in line with the latest edition of the American Standard Listing Requirements for Automatic Pilots, Z21.20-1940. As an added factor of safety, where a push-button or trigger type valve is used on an automatic pilot to permit opening the gas supply to the main burner for ignition purposes, such valves are required to be constructed without latching in the open position.

Another important revision incorporates recommendations of the Subcommittee on Test Gases and Test Pressures which provide for various performance tests with mixed natural and coke oven gas of 800 Btu./cu. ft. content. Similar applicable revisions were incorporated in the current requirements for attachable gas water heating units.

In order that all comments from the industry may be considered by the subcommittee at its next meeting, which is tentatively scheduled to be held before the end of the calendar year, it is requested that criticisms be submitted to the subcommittee in care of the American Gas Association Testing Laboratories, 1032 East 62nd Street, Cleveland, Ohio, on or before December 1, 1940. It is expected that the resulting revisions will be acted on by the Approval Requirements Committee early next year, following which they will be submitted to the American Standards Association. It is further anticipated that these two sets of specifications will be completed in time to set the effective date as of January 1, 1942.

Consolidated Edison Radio Show

"On the Air" for its sixth successive season is Consolidated Edison System's radio show, "Echoes of New York." A half-hour topical revue, "Echoes" is broadcast over WJZ on Wednesday evenings. Its permanent cast includes the Edisoneers male chorus, the Gas House Boys, Linton Wells, commentator, Jack Arthur, master of ceremonies, Quiz Master Paul Wing, Kay Lorraine, vocalist, and Josef Bonime and his concert orchestra. The real old-time hurdy gurdy introduces the program's theme song, Victor Herbert's "Streets of New York." The show is produced by McCann-Erickson, Inc., under the supervision of Clarence L. Law, vice-president, Consolidated Edison.

Webb Is A. S. M. E. Program Chairman

T. C. Webb, Jr., of the Technical Service Department of Clark Bros. Co., Inc., has recently been appointed program chairman for the program year beginning Sept. 1st, by the Midcontinent Section of the American Society of Mechanical Engineers.

Mr. Webb has been with Clark Bros. for the past three years. A few months were spent at the company's factory at Olean, New York, since which time he has been stationed at the company's Tulsa office.

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

Dresser Acquires Pacific Pump Works

Of interest to the producing, pipe line and refining divisions of the oil and gas industry is the announcement by the Dresser Manufacturing Company of their acquisition of the Pacific Pump Works, of Huntington Park, California.

Pacific Pump Works, established in Huntington Park in 1924, manufacture various types of centrifugal pumps for refineries and boiler feed water plants. They also produce turbine pumps for water wells and deep well plunger pumps for oil field production.

A. R. WEIS
President

J. B. O'CONNOR
Chairman of Board

R. E. REIMER
Sec'y-Treas.

Other subsidiaries of the Dresser organization include Clark Bros. Co., Inc., of Olean, New York, and the Bryant Heater Company, of Cleveland, Ohio. .

The combined personnel of all organizations will run well over 1500 people. Outside of changes announced in management, personnel and directorate, the operations of the Pacific Pump Works will continue on the same basis with no variation of company policy.

J. B. O'Connor, vice-president of Clark Bros., Inc., will serve as chairman of the board of directors. A. R. Weis, formerly vice-president of Pacific Pump, was elected president of the California company, and R. E. Reimer, treasurer of Dresser, has been named the secretary-treasurer. Directors include J. B. O'Connor, A. R. Weis, H. N. Mallon, C. P. Clark and R. E. Reimer, of Dresser.

Mr. Weis, in commenting upon plans of the company for the future, said: "It is our belief that this move is of benefit not only to the companies directly affected but to the industry which we serve as well. The Dresser Manufacturing Company and Clark Bros. will now have a Pacific Coast plant and organization, while the Pacific Pump Works will benefit through plant and sales representation in the east on a much broader scale than was possible heretofore. The Pacific Pump Works will continue to operate as a separate unit, but, covering on the Pacific Coast a somewhat parallel field to that covered by the Dresser and Clark companies in the east and middle west, the three companies will cooperate in sales, service and engineering."

Penna. Natural Gas Men's Assn.

The October dinner meeting of Pennsylvania Natural Gas Men's Association was held at Pittsburgh on October 25th.

The speaker, Judson Bonsall, Superintendent of Compressing Stations, of Equitable Gas Company and Pittsburgh and West Virginia Gas Company, located at Clarksburg, West Virginia. His subject was "The Design and Operation of Modern Field Compressing Stations."

Reduction in Gas Rates on P. G. & E. System

New natural gas schedules on the Pacific Gas & Electric system which became effective October 22, not only reduce rates substantially but also shorten the usage blocks, on which there are progressively lower rates, thus giving customers the added advantage of automatic decreases in price much faster than heretofore.

In San Francisco monthly bills for 3000 cubic feet will drop from $2.40 to $2.08, for 4000 cubic feet from $2.93 to $2.54, for 5000 cubic feet from $3.46 to $3, and so on. The resultant savings to customers will approximate $770,300.

Oakland, Berkeley, Piedmont, Alameda, Emeryville and Albany have exactly the same rates as San Francisco and the public's savings in these cities will aggregate more than $670,000 a year.

As in the case of electricity, the schedules for the remainder of the system vary slightly according to the location of the cities and towns, but all communities served with natural gas benefit handsomely.

Southern California Gas on the Air

Southern California Gas Company and Southern Counties Gas Company initiated on October 1 a schedule of two-hour evening radio concerts featuring classical music, which were broadcast from eight to ten, six nights a week, over radio station KFAC.

The first schedule of broadcasts ran from October 1 to October 31, and included recordings of concert and operatic music by many world renowned orchestras, instrumentalists and singers. The response on the part of the public has been enthusiastic.

H. S. Boyle Appointed Vice Pres. of Burkay Company

Appointment of H. S. Boyle, as vice-president in charge of sales and advertising of the Burkay Company, of Toledo, Ohio, has been announced by Joseph W. Robinson, president. The selection of Mr. Boyle is in keeping with the general expansion policy of the company. The Burkay "volume-flow" system, although relatively a newcomer in the gas appliance business, has already made itself felt in this important field of gas development.

Walter G. Groth, vice-president, who has been handling the gas utility development of this business, will continue his activities as sales manager—Eastern Division. The Burkay Pacific Co., of Los Angeles, under the direction of Walter E. Campbell will serve the utilities and dealers west of the Rockies. The Burkay Sales Co., of New York, under the direction of Sam Sperans, will represent the company in the New York Metropolitan area.

"Hank" Boyle, who comes to Burkay with years of successful appliance sales and promotional experience with Servel and others, will direct the national organization from headquarters at Toledo, Ohio.

In discussing the application and scope of the new appliance, Mr. Boyle said:

"The application of the Burkay patented burner to volume-flow, high and low temperature water heating, is but one of a number of uses to which this latest type gas burner can be put. Plant facilities have been expanded so as to include the production of Burkay forced circulating hot water house-heating equipment for new and old dwellings."

Large Scale Production of Oxygen and Other Gases

As a result of intensive development, and after exhaustive tests, a highly efficient method of oxygen production has been evolved by The Industrial Gas Engineering Company, 5700 Greene Street, Philadelphia, Pa., which offers this patented service.

Their personnel has had wide experience in this field over the past thirty years. Large production plants have hitherto not been available in the United States. They now offer plants in any desired capacity (1000 cu. ft. to 20,000 or more cu. ft. per hour) of any desired purity and at a low cost. They also offer plants for the production of other industrial and technical gases such as hydrogen, helium, nitrogen, carbon dioxide, etc.

Summary of Data	*CC. to 200° C.*	*% Vol.*	*Gallons per M* (h)	*Yield from Carburetting Oil % Vol.* (i)
Forerunnings to 75° C.	4.5	3.3	.0130	0.33
2° Benzol	49.3	35.7	.1410	3.57
2° Toluol	34.2	24.8	.0980	2.48
Refined solvent naphtha 4.0 " " " 1.5	5.5 (f)	4.0	.0158	0.40
Crude Heavy naphtha 3.0 " " " 15.5	18.5 (g)	13.4	.0529	1.34
Straight run residue	12.0	8.7	.0344	0.87
Washing loss	14.0	10.1	.0399	1.01
Distillation loss	—	—	—	—
Total	138.0	100.0	.3950	10.0

(f) The 5.5 cc. shown here is found as follows: 4 cc. comes from the 17% of xylol found in the 23.5 cc. in cut 110° to 138° C. shown in Ref. Col. Deph. The other 1.5 cc. is ⅓ of the 4.5 cc. of Residue found in the Ref. Col. Deph.

(g) The 18.5 cc. here shown comes from following: 15.5 cc. is found between 160° and 200° C. in crude separation. The other 3 cc. is ⅔ of the 4.5 cc. of Residue found in the Ref. Col. Deph.

(h) Gallons per M calculated from cc. of distillate to 200° C. from crude separation corrected for gas passed

$$\frac{\text{cc. of oil to 200° C. X 1000}}{\text{corr. gas passed X 3785.4}} = \text{gals. of oil per M}$$

(i) Yield from carburetting oil, % volume = gals per M divided by corrected carburetting oil used per M

$$\frac{\text{gals. of oil per M}}{\text{gals. of oil carb. per M}} = \text{\% vol. yield}$$

additions of 10cc. of 100% sulphuric acid are added, oil-acid mixture cooled, then shaken vigorously until mixture no longer heats on shaking. The fractions 75° to 110° C. and 110° to 138° C. are then heated for an hour at 60° C. and the residue over 138° C. is heated at 95° C. with occasional shaking while heating. After one hour bottles removed from baths, allowed to cool, and filled to top of graduations in neck with 93% sulphuric acid and whizzed for 5 minutes in a centrifuge. The readings are read off and per cent calculated from the divisions on the neck of the flask. The bottles are kept corked during the sulphonation. The 75° to 110° C. and 110° to 138° C. fractions are almost always free of sulphonation residue. The residue above 138° C. usually contains between 3 and 5% sulphonation residue, some of which is due to straw oil.

If the 75° to 110° and 110° to 138° C. cuts contain more than 3% of sulphonation residue, corrections should be applied when calculating the percent of benzol, toluol present in the oil.

Obituary

GEORGE B. CORTELYOU

George B. Cortelyou, retired President of the Consolidated Gas Company of New York (now known as Consolidated Edison Company of New York) died suddenly at his home at Huntington, Long Island, on Wednesday, October 23. He was seventy-eight years old.

George Bruce Cortelyou was the fourth President of the Consolidated Gas Company of New York (now known as Consolidated Edison Company of New York), retiring on July 1, 1935. He joined the Company in March, 1909, as President and Trustee, just after he had retired as Secretary of the Treasury in President Theodore Roosevelt's cabinet.

During the twenty-six years he served as President (1909-1935) the Consolidated Gas Company grew from an organization of 11,000 employees to more than 45,000. The assets of the Company increased from $332,324,856.95 in 1909 to more than $1,300,000,000 in 1934.

Mr. Cortelyou was born in New York City on July 26, 1862. His ancestors were distinguished in Colonial and Revolutionary history in the State of New York.

His Washington career started in 1891, when he became private secretary to the Fourth Assistant Postmaster General. In November, 1895, he was transferred to the

George B. Cortelyou

Executive Mansion as stenographer to President Cleveland, and three months later he was made executive clerk to the President.

In 1898 Mr. Cortelyou became an assistant secretary to President McKinley, and in 1900 he was appointed Secretary to the President.

Mr. Cortelyou continued as Secretary to the President under Theodore Roosevelt until 1903, when he entered the cabinet as the first Secretary of the newly created Department of Commerce and Labor. He organized the department and mapped out the lines along which it has since developed.

Mr. Cortelyou had the distinction of being the only person to serve as President of both the American Gas Association and the National Electric Light Association. In 1918 he became the first President of the American Gas Association, serving two terms. He was elected President of the National Electric Light Association in 1932, and later became President of the Edison Electric Institute.

CHARLES G. GROFF

Charles G. Groff, president and chairman of the board of the Electrolux Corporation, 500 Fifth Avenue, New York, and chairman of the board of directors of Servel, Inc., 15 East Forty-second Street, New York, died October 24th at the Greenwich Hospital after a long illness. He was sixty years old.

Mr. Groff was born in Edgerton, Ohio, where he began his career first as a teacher and then as a salesman for a book publishing house. After a few years he moved to Bryan, Ohio, where he worked in both the editorial and advertising departments of a newspaper.

Charles G. Groff

He became president of the Electrolux Corporation in 1933, and in the following year became chairman of the board of Servel, Inc., manufacturers of gas refrigerators, while retaining his active direction of the Electrolux Corporation.

C. A. JEFFERIS

Charles A. Jefferis, who retired last year from the office of general superintendent of the Consumers' Gas Company, Toronto, Ontario, died October 8th at the Toronto General Hospital after a short illness.

Mr. Jefferis was widely known in engineering and industrial circles both in Canada and in the United States. He served the Consumers' Gas Company during a period of great expansion and was highly regarded not only for his technical knowledge and progressiveness, but also for his personal qualities. On his retirement a year ago last March an illuminated address from his workmen said, in part: "Throughout the thirty-eight years of your service we have always regarded you as one to whom we may turn as a friend rather than as a boss."

Mr. Jefferis was born in Bristol, England, and came to Kentucky with his parents as a young man. He was for some time engaged in railroad construction. Later he engaged in engineering work in the gas industry, and in 1901 he went to Toronto to join the staff of the Consumers' Gas Company.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of American Gas Journal, published monthly at East Stroudsburg, Pa., for October, 1940.

State of New York } ss.
County of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared S. G. Krake, who, having been duly sworn according to law, deposes and says that he is the Manager of the American Gas Journal and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are: Publisher, American Gas Journal, Inc., 53 Park Place, New York City; Editor, Alfred I. Phillips, 53 Park Place, New York City; Business Manager, H. T. Matthew, 53 Park Place, New York City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) S. G. Krake, 53 Park Place, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom said trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ——. (This information is required from daily publications only.)

S. G. KRAKE,
Manager.

Sworn to and subscribed before me this 19th day of September, 1940.

(Seal.) MARY E. KELLEHER.

(My commission expires March 30, 1942.)

VISIT OUR NEW BAR

HOTEL CHELSEA

SPECIAL WEEKLY RATES

Enjoy the Seashore
THE YEAR 'ROUND

Delightful in any season, Atlantic City is never nicer than right now. And whether you seek recreation or relaxation, the Hotel Chelsea is splendidly equipped to make your visit comfortable and pleasurable. Outside rooms • Sundeck • Beautiful dining room at ocean's edge • Superb cuisine • Sports • Entertainment • Magnificent Bar •

FROM
$6 Room, Bath, Meals
$3 Room Only & Bath
Per Person, 2 in Room

ATLANTIC CITY

In Cleveland—It's The
COLONIAL HOTEL

"Cleveland's Small Hotel in the Midst of the Large Hotels"

Thru the Colonial Arcade from Euclid and E. 6th

Large, Clean, Well Furnished, Comfortable Rooms at $1.50 Single and Upwards.

You'll Enjoy Our
DELIGHTFUL GRILL BAR

Randall M. (Duffy) Lewis, Mgr.

Beal Medal Award to Raymond F. Hadley

Highest technical recognition in the gas industry was conferred today on Raymond F. Hadley, electrical engineer of the Susquehanna Pipeline Company, Philadelphia, Pa., at the closing general session of the annual convention of the American Gas Association at Atlantic City, N. J. Mr. Hadley received the Beal Medal for contributing the best technical paper to meetings of the Association throughout the year.

The award was presented by the donor, Ernest R. Acker, president of the Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y., representing the family of the late W. R. Beal who established the award in 1897. It consists of a bronze medal and substantial cash payment.

The paper for which Mr. Hadley was so singularly honored is entitled "Studies in Microbiological Anaërobic Corrosion." Mr. Hadley's paper focuses attention on a type of pipe corrosion which only recently has been recognized in the United States. It involves the anaërobic bacteria which live in an atmosphere devoid of oxygen but can survive for long periods of time when brought to the surface.

Once the bacteria have taken hold, the maximum life of a pipe is approximately 7 to 10 years. The rate of corrosion under their attack is said to be nearly three times that of other types, with the exception of carbon contact, stray electric currents and concentrated acid.

Mr. Hadley's paper discusses the products resulting from this type of corrosion and contains tests showing the presence and degree of this corrosion. Its prevalence on operating lines in several eastern states is illustrated by actual field data. It is shown from this data that the shape of the pit depth-time curves is radically different from pit depth - time curves of other types of corrosion.

J. V. Postles of Philadelphia is chairman of the Beal Medal Award Committee whose recommendation was approved by the Association's executive board. Other members of the committee are: F. M. Goodwin, Newton Centre, D. P. Hartson, Pittsburgh, T. R. Weymouth, New York and Burt R. Bay, Omaha.

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"Now let's look at what people would like to have if they had a free choice and all costs were the same. It seems that there are two lessons which stand out above all others. The first is that if people could have exactly what they wanted for performing these four jobs, gas would lose ground in two fields and gain ground in two others. There would be a substantial loss in the cooking load and a slight loss in the water heating load. There would, however, be a slight gain in refrigeration and an immense gain in house heating.

"This immediately suggests the desirability of viewing both house heating and refrigeration as new and fertile fields for expansion in a direction where sales resistance is at its lowest. Seeds of the desire are there.

"Not so cheerful is the prospect of losing some of the water heating load and a substantial amount of the cooking load. You will note that in the case of cooking, it is electricity which would cut in on you, and in the case of water heating, it is also electricity to some extent, but more particularly oil. I suggest that this means that while your new business departments are aggressively tackling the expansion of your load via house heating and refrigeration, some thought must be given to how you can hold what you have got, particularly in cooking.

"An examination brings us to the second major finding of this study, and in my opinion, the most important one. We find that many more people would like to use gas for each of the four uses under discussion than there are people who believe gas will be most used ten years from now. And this springs from no melancholy spirit of pessimism. Such a spirit would prompt people to gloomily forecast either a continuance of present methods or retrogression, and such, you will notice, is not the case here. Our respondents are envisaging what seems to them to be progress.

"You will note that in each of the four fields, the largest number of those picking electricity to outdistance gas gave as their first reason that it is 'the trend of the times—it is the coming thing.'

"So, apparently in the minds of these respondents electricity is identified with progress and gas is thought to be on the way out. That gas need not be on the way out, nor considered so, is amply illustrated in that many more people would like to have it than think they will be permitted to have it ten years from now.

"The problem must be attacked nationally if the industry is to avoid slipping still further in public esteem. It is, in my opinion, futile to hope that some day the public will wake up to whatever advantages there are inherent in gas. It isn't their job to discover gas; it is your job to tell them. It is your job to run a business that makes them think it is identified with progress, not oblivion. It is my personal belief that even the electric utility industry would profit in the long run if you did."

Personnel Practices

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In making the presentation, Mr. Donaldson pointed out that Mr. Field had done unusually fine work in connection with the natural gas course, and that his papers evidenced a thorough understanding of all subjects covered by the course. It was stated that Mr. Field did not submit a single poor paper during the entire course. He enrolled in the course in August, 1938, and finished it at the end of December 1939 which is evidence of his energetic application of effort in his work as it generally takes two years or more to complete the course. Mr. Field, who is 34 years old, was graduated from the Marshall, Texas, high school after which he took a course in engineering in Schenectady, N. Y.

The Natural Gas Extension Course at the University of Kansas was prepared with the aid of many outstanding authorities in the natural gas industry and in cooperation with an Advisory Committee from within the industry. This committee was composed of Frank L. Chase, at that time vice-president and operating manager of the Lone Star Gas Company, Dallas; A. B. Macbeth, president of the Southern California Gas Company in Los Angeles; J. D. Creveling, president of the Panhandle Eastern Pipe Line Company, New York; and Dr. J. B. Garner of the Hope Natural Gas Company. These men devoted much time assisting Dr. Young and his staff in the preparation of a course which would include the most practical and useful instruction possible.

Since the inception of the course it has had enthusiastic acceptance throughout the country. More than 450 gas company employees have been enrolled in this course.